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Factors influencing on income generation of sericulturists

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Abstract
Sericulture is recognized as an important rural as well as cottage industry in India. It is the only cash crop that provides attractive incomes to the farming community in general, small and marginal farmers in particular and improves the standard of living and life style of the people in rural area by providing sufficient income opportunities of the rural people. The aim of the study was to determine the factors effecting on income generation in sericulture in the selected districts of Karnataka namely, Ramanagara, Chikkaballapur and Kolar districts. The study was exclusively based on secondary data. For the study fourteen years of data on area under mulberry, quantity of cocoons produced, price of cocoons and income was collected from the respective district office. The collected data was analyzed using statistical tools such as, correlation, simple linear regression and multiple linear regression. The paper finds the area under mulberry and price of cocoons are significant determinants in generating income in sericulture in all the districts.

Keywords: Area under mulberry, cocoon, income generation, sericulture

Introduction

Sericulture, being low capital intensive agro-based sector, suits landless farmers and low-skilled artisans. In India silk industry plays a very important and significant role in textile market. According to history Buddhist monks from China brought silkworm eggs and sericulture technology to India. India has a unique characteristic of producing five commercial silks namely, mulberry silk, muga silk, eri silk, tropical and oak tasar silk. Among them muga silk is characterized with yellowish golden tint and propagated to Assam state in India. Karnataka, Tamil Nadu, Andhra Pradesh, Jammu & Kashmir and West Bengal are the major mulberry silk producing states in the country.

Karnataka has history of more than 215 years in Sericulture. In Karnataka to produce and supply the disease free layings to the sericulture farmers 58 government grainages, 215 private grainages and 6 central silk board grainages are working. Among the 58 government grainages 15 grainages are working under Mysore seed area and 6 grainages are working under bivoltine seed areas. Kolar, Chamarajnagar, Rural Bangalore, Mysore, Mandya and Tumkur are the sericulture concentrated districts in Karnataka. Among these first five districts is having about 78 percent of area under mulberry. Sericulture provides employment to nearly about 10.67 lakh people either in direct or in-direct way. One hectare of mulberry provides yearlong continuous employment for 13 persons. Multivoltine and bivoltine seed areas are well established in Karnataka.

The study was taken up in major sericulture districts of Karnataka *viz.*, Chikkaballapur, Kolar and Ramanagara districts based on area under mulberry production and mulberry cocoon production. Chikkaballapur district is having major sericulture practiced families. There are 3,354 reeler families of which 30 are engaged in multi end units. Area under mulberry in district is 13,358.53 hectares, in which 1,131 villages covering 15,570 families. Annually 145.55 lakh disease free silkworms layings are brushed to produce 942 Mt of silkworm cocoons and silk of 1,346 Mt with average yield 71 kg per 100 disease free layings and generates Rs.282 cores income for the sericulturists.

Kolar is known for silk and milk. The socio-economic life of farmers depends on sericulture activities. Area under mulberry cultivation is 19,617 ha and Mulberry cocoon production is 10,062.45 MT. Ramanagara is well known as Silk City. There are 26,012 sericulturists in 3 taluks of the district with 30 ha under mulberry in 1,148 villages. During 2019-20 in the District 268.387 lakhs of cross-breed and Bivoltine disease free layings brushed and produced 19492.912 MT cocoons.

Based upon the articles reviewed researches were conducted on increasing or stabilizing the income. In sericulture, there is a research gap on the factors that influence income creation, which will be addressed in this study. There were several factors affecting on income generation in sericulture viz., area under mulberry, quantity of cocoons produced, price of cocoons, land productivity, technical efficiency and pest and disease incidence.

Material and Methods

The study was taken up in major sericulture districts of Karnataka *viz.*, Chikkaballapur, Kolar and Ramanagara district. The research study was based on secondary data. The secondary data was collected from April 2006 to September 2019 from the State Sericulture Department, Government of Karnataka, Chikkaballapur district office (Sericulture department), Kolar district office (Sericulture department) and Ramanagara district office (Sericulture department). The data was analyzed using simple and multiple linear regression model (Nageshwara Rao, 2008). The data regarding income generation will be treated with simple linear regression by taking income as dependent/response variable and determinants of income generation as independent variable/explanatory variable *i.e.*, Area under mulberry, quantity of cocoons produced and price of cocoons.

Results and Discussion

The findings of simple regression models of income in the Kolar district are shown in Table 1. The coefficient of determination (R2), standard error of coefficient (b), and root mean square error values for each model are listed in the Table. From the table it was deduced that the price of accounted for 90 percent of the fluctuation, with a root square error of 4.315 followed by area under mulberry (61%). Table 2 shows the results of Ramanagara district that the price of cocoons (with a root mean square error of 7.403) explains 96 percent of the variation, followed by the area under mulberry production (77%) with a root mean square error of 19.42. While the table 3 shows the in Chikkaballapur district cocoon price explained 94 percent of variation with a root mean square error of 7.469, followed by area under mulberry production (30%) with a root mean square error of 27.69.

Table 1: Simple regression model for income of Kolar district

Parameters	Model	SE(b)	R^2	MSE	RMSE
Area under mulberry	Y = 116.22 + 0.0035X*	13.878	0.6183	189.64	13.77
Cocoons produced	Y = 111.43 + 0.0045X	12.515	0.3236	134.26	11.58
Price of cocoons	Y = 124.83 + 0.0042X**	4.661	0.9061	18.62	4.31

Table 2: Simple regression model for income of Ramanagara district

Parameters	Model	SE(b)	R2	MSE	RMSE
Area under mulberry	Y = 144.11 + 0.0097X**	20.983	0.7712	377.42	19.42
Cocoons produced	Y = 279.92 + 0.0093X*	32.833	0.4542	542.91	23.28
Price of cocoons	Y = 163.78 + 0.0026X**	7.996	0.9667	54.81	7.40

Table 3: Simple regression model for income of Chikkaballapur district

Parameters	Model	SE(b)	R2	MSE	RMSE
Area under mulberry	Y = 209.19 + 0.0057X*	29.918	0.3019	767.26	27.69
Cocoons produced	Y = 208.44 + 0.0027X	12.730	0.1245	1094.29	33.08
Price of cocoons	Y = 154.48 + 0.0029X **	8.068	0.9492	55.79	7.46

Note: *Significant at 5 percent; **Significant at 1 percent

The results from Table 4 indicated the multiple regression model for income of Kolar, Ramanagara and Chikkaballapur districts and it was inferred that in Kolar district the price of cocoons and area under mulberry had a positive and significant influence, whereas the number of cocoons produced, had negative and non-significant effect. The variables in the model explained 92 percent of the variance. The graphs that correspond to the model are shown in Figure 1.

While the price of cocoons and the area under mulberry had a positive and significant impact in Ramanagara and Chikkaballapur districts, the number of cocoons produced had a positive but non-significant impact. The models variables explained 97 percent and 95 percent of the variation, respectively. Figures 2 and 3 show the graphs that correspond to the model.

Table 4: Multiple regression model for income

Districts	Model	R^2
Kolar	Y = 120.8710 + 0.00121X1* – 0.00099X2 + 0.003826X3*	0.924
Ramanagara	Y = 162.476 + 0.00013X1* + 0.00013X2 + 0.00260X3*	0.977
Chikkaballapur	Y = 150.8773 + 0.00079X1* + 0.000008X2 + 0.00277X3*	0.953

Note: *Significant at 5 percent
X1: Area under mulberry, X2: Cocoons produced, X3: Price of cocoons

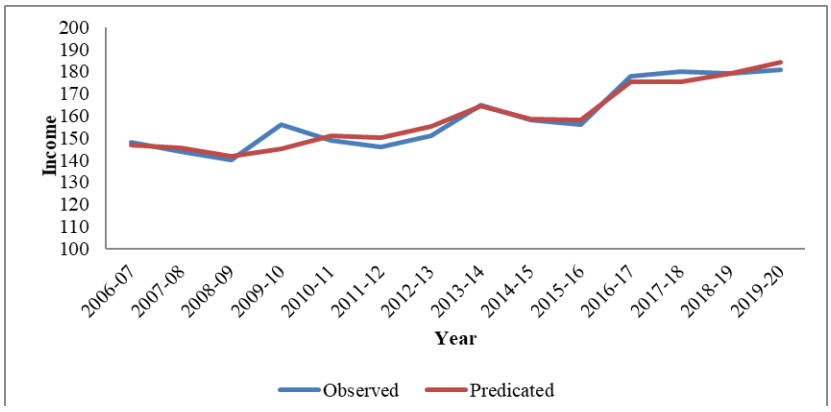

Fig 1: Multiple linear regression model of Kolar district

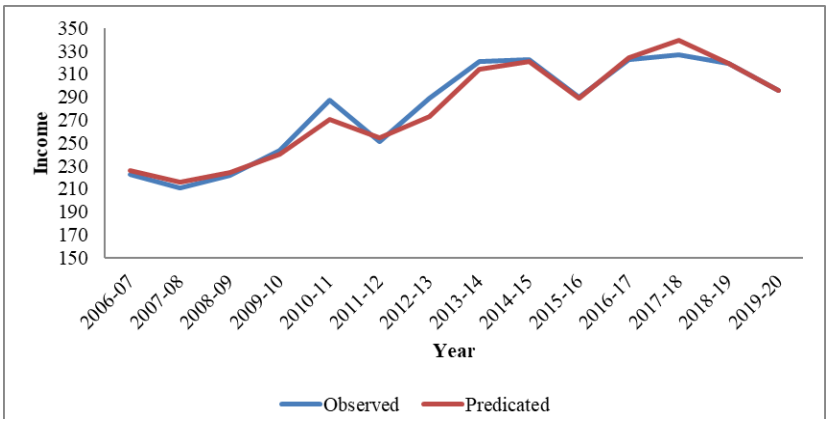

Fig 2: Multiple linear regression model of Ramanagara district

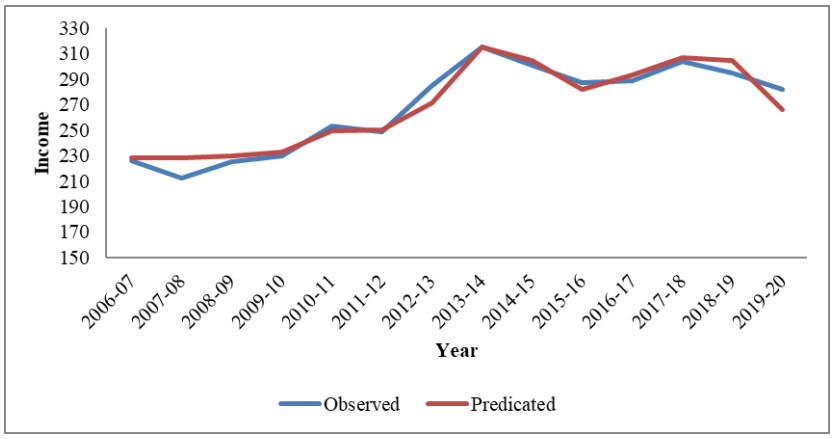

Fig 3: Multiple linear regression model of Chikkaballapur district

Conclusion

From both simple linear regression and multiple linear regression the present study showed that, price of cocoons had more influence on the income followed by area under mulberry production. Hence the study concludes that, the area under mulberry and price of cocoons had deduced as significant explanatory variables for upward rising slope in the income generating curve of sericulture. Based on the study it was suggested that my growing good variety of mulberry and by following by proper package of practices sericulture farmers can produce good quality of cocoons which fetches good price in the market there by income of farmer was increased.

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