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RESEARCH ARTICLE

EMPLOYMENT OPPORTUNITY OF SERICULTURE FARMING SYSTEM IN BEED DISTRICT

[1,*]Nadarge, S. C., [2]Gawande, S.C. and [3,*]Munde, T.B.

[1]Department of Agricultural Economics and Statistics, VNMKV, Parbhani, India
[2]College of Agriculture, Akola, India
[3]Department of Agriculture Economics and Statistics, PGI, Dr. PDKV, Akola, India

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ABSTRACT

Silk industry in India presently provides gainful employment to an estimated five million persons in the downstream activities of mulberry and non-mulberry subsection. In this challenging scenario, more investment is required for seeding technology, building farmer level infrastructure and for empowering bivoltine sericulture industry. A large chunk of labour is employed in all the sericulture activities and the industry is a boon to the labour surplus countries like India. Sericulture also employs a sizable share of women labour. The women participation in sericulture ranges between 55 and 60 per cent. The year 1994 was observed as "The year of women in sericulture". Multistage sampling design was adopted for the selection of district, tehsils, villages and sericulture producers. Analytical techniques for first objective that is work out the extent of employment generated from sericulture farming were achieved by tabular analysis and second objective i.e. resource use efficiency was achieved by application of functional analysis. In functional analysis linear and Cobb Douglas production function were used. In regard to employment generation in sericulture is considered to be principle cash business in the study area, which generates employment throughout the year. Sericulture is female labour oriented economic activity in the rural areas. The sex ratio in labour participation in the sericulture was 01:01:80, through the sex ratio it is clear that female labour participation is much higher in sericulture than male labour participation, thus sericulture prove best among rural poverty irradiation in the rural areas of the region. Resource productivity marginal productivity with respect to and use of mulberry leaves was (2.575 kg) followed by marginal product of disinfecting material (0.794 kg), family human labour (0.511 kg) and diseased free lying (0.268 kg). It inferred that if use of mulberry leaves were increased by 1 at its geometric mean level, it would lead to increase production of 2.575 kg. In other words use of mulberry leaves, disease free layings, disinfecting material and family human labour, were found, under-utilization and hence there is need to increase these resources in cocoon production.

INTRODUCTION

Cultivation of mulberry and rearing of silkworms are the two activities generally performed by the silk cocoon producer. Cultivation of mulberry plants is called as moriculture. There are about 20 species of mulberry of which four species are more common *Morusalba, Morusindica, Morus serrate, Moruslalifolia*. Mulberry cultivation involves various farming practices. Mulberry cultivation is agricultural in nature. The operations involved being simple straight and easy to be carried out. The growth and development of silkworm and the cocoon quality is largely depending on the nutritional status of the mulberry leaves. Silk industry in India presently provides gainful employment to an estimated five million persons in the downstream activities of mulberry and non-mulberry subsection. In this challenging scenario, more investment is required for seeding technology, building farmer level infrastructure and for empowering bivoltine sericulture industry. It is not only technology but also capital intensive, financial assistance is important for upgrading mulberry gardens with the productive varieties, building, rearing houses, purchase of new silkworm culturing and cocooning equipment like shelves and rotary mountages, water management device like drip irrigation kite. A major parts of such assistance to the farmer as a long term measure would insure building foundation of bivoltine sericulture laid in the country. A large chunk of labour is employed in all the sericulture activities and the industry is a boon to the labour surplus countries like India. Sericulture also employs a sizable share of women labour. The women participation in sericulture ranges between 55 and 60 per cent. The year 1994 was observed as "The year of women in sericulture".

***Corresponding author:* Nadarge, S. C.,**
Department of Agricultural Economics and Statistics, VNMKV, Parbhani, India

Objectives

- To work out the extent of employment generated from sericulture farming

- To work out resource productivity and resource use efficiency in cocoon production

MATERIALS AND METHODS

Sampling Design

Selection of sericulture producers

Multistage sampling design was adopted for the selection of district, tehsils, villages and sericulture producers. In first stage, Beed district was purposively selected because of maximum area under mulberry plantation i.e. 347.4 hectare. In second stage, Beed, Keij and Ambajogai tehsils were selected on the basis of maximum area under mulberry plantation and highest number of sericulture producers. In the third stage two villages from with selected tehsils viz. Nagapur and Neknur from Beed, Kisegaon and Adas from Keij and Warap and Chanai, from Ambajogai tehsil were selected for the study. In final stage from each selected village, ten sericulture producers were randomly selected. In this way from six villages of three tehsils, 60 sericulture producers were selected.

Collection of data

Cross sectional data were collected with the help of well-structured, pretested schedule by personal interview method. The data were collected during the year 2015-2016.

Analytical Techniques

First objective that is work out the extent of employment generated from sericulture farming were achieved by tabular analysis and second objective i.e. resource use efficiency was achieved by application of functional analysis. In functional analysis linear and Cobb Douglas production function were used. For analysis of data on the basis of goodness of fit (R^2), Cobb- Douglas production function (non linear) was used to determine elasticity of production in sericulture business. The data were therefore, subjected to functional analysis by using the following form of equation.

$$Y = a\ X_1^{b1} X_2^{b2}\ X_3^{b3} \ldots\ldots\ldots\ X_n^{bn} e^u$$

In this functional form 'Y' is dependant variable, 'Xi' are independent resource variables 'a' is the constant representing intercept of production function and 'bi' are regression coefficients of respective resource variables. The regression coefficients obtained from this function directly represent the elasticity of production, which remain constant throughout the relevant ranges of inputs of sum of coefficients that 'bi' indicates the nature of returns of scale. This function can easily be transformed into a linear form by making logarithmic transformation. After logarithmic transformation this functionis,

$$\text{Log } Y = \text{Log } a + b_1 \text{ Log } X_1 + b_2 \text{ Log } X_2 + \ldots\ldots\ldots + bn \text{ Log } Xn + u \log e.$$

The main consequences of multi-collinearity area (a) the sampling variances of the estimate coefficients increases as the degree of collinearity increases between the explanatory variables (b) estimated coefficients may become very sensitive to small changes in data that is addition or deletion of few observations produce a drastic change in some of the estimates of the coefficients. This result in non significance of regression coefficients sometimes it so happens that more of the regression coefficients are significant but the value of R^2 is very high. The equation fitted was of the following formula.

$$Y = a\ X_1^{b1} \cdot X_2^{b2} \cdot X_3^{b3} \cdot X_4^{b4} \cdot X_5^{b5} \cdot X_6^{b6} \cdot X_7^{b7}$$

Where
Y = Estimated cocoon production income per kg per annum (Rs)
a = Intercept of production function
bi = partial regression coefficient of the respective resource variable (i = 1, 2,..7)
X_1= Hired human labour in man day per annum
X_2= Family human labour in man day per annum
X_3= Disease free layings in number per annum
X_4 = Mulberry leaves in quintals per annum
X_5= Disinfecting material in kg per annum

The marginal value of resource productivity indicates the addition of gross value of farm production for a unit increase in the 'i^{th}' resources with all resources fixed at their geometric mean levels Heady and Dillion (2002). The MVP of various input is worked out by the following formula.

$$\text{MVP} = \frac{b\bar{Y}}{\bar{X}} Py$$

Where,
b = Regression coefficient of particular independent variable
X = Geometric mean of particular independent variable
Y = Geometric mean of dependant variable
Py= Price of dependent variable

Optimum Resource Use

$$X_i = \frac{b.\bar{Y}.Py}{Px}$$

Where
X_i = Optimum resourse use
b_i = Elasticity of production resource
$\bar{Y}$ = Geometric mean of production
P_x= Price of input
P_y = price of product

RESULTS AND DISSCUSSION

Employment Generation

Sericulture is considered to be principle cash business in the study area, which generate employment throughout the year. Employment generation in sericulture in study regions is indicated in the Table 1. Sericulture offer employment to the extent of 229.05 man days, out of which 101.71 where the male days, and 127.34 where the female days, for the area of 0.49 hectares. Mulberry sericulture generated labour employment in its activities such as garden establishment, leaf production and silk worm rearing.

Sex Ratio in Labour Participation

Sericulture is female labour oriented economic activity in the rural areas. Its observed from the table that the sex ratio in labour participation in the sericulture was 01:01:80, through the sex ratio it is clear that female labour participation is much higher in sericulture than male labour participation, thus sericulture prove best among rural poverty irradiation in the rural areas of the region. The results were conformity with the result obtained by by Lakshmanan and Geetha Devi (2007) in regard to employment generation in sericulture.

Table 1. Annual labour employments generated from sericulture farming

Crop	Area(ha)	Labour employment (day)			Sex ratio
		Male	Female	Total	
Sericulture	1	207.57	259.88	467.45	01:01.80
	0.49	101.71	127.34	229.05	01:01.80

Resource productivity and resource use efficiency

Regression coefficients with respect to various explanatory variables were estimated and are presented in Table 2.

Table 2. Estimates of Cobb-Douglas production function in cocoon production

	Independent Variable	Regression Coefficient (bi)	Standard Error (SE)	't' Value	Geometric Mean (Xi)	Marginal Product (kg)	Marginal Value Product	Price of Input (Rs.)	MVP to price ratio
1.	Hired human labour (man day/annum)	-0.235	0.139	-1.689	30.59	-4.642	-1688.33	200.00	-8.44
2.	Family human labour (man day/annum)	0.101	0.195	0.518	119.43	0.511	185.86	200.00	0.93
3.	Disease free layings (no/annum)	0.452	0.168	2.680**	1018.56	0.268	97.53	14.00	6.97
4.	Use of mulberry leaves (q/annum)	0.633	0.246	2.576*	148.52	2.575	936.67	172.56	5.43
5.	Disinfecting material (kg/annum)	0.309	0.138	2.238*	235.110	0.794	288.84	60.00	4.81

Intercept (log a) = 2.285; F value= 81.46**; R2 = 0.843; Return to scale (∑bi)= 1.26

Note: Geometric mean of±(Y) of cocoon production was 604.23 kg/annum and price was Rs 363.72 per kg

*Significant at 5 per cent**;** **Significant at 1 per cent level

Regression coefficient of disease free layings was 0.452 which was positive and highly significant at 1 per cent level. It implied that when 1 per cent increases in disease free layings, it would lead to increase the cocoon production by 0.452 per cent over its geometric mean. Similarly regression coefficient with respect to disinfecting material and use of mulberry leaves were 0.309 and 0.633 which were positively significant at 5% level, It inferred that when use of disinfecting material and of mulberry leaves were increased by 5 per cent, it would lead to increase in cocoon production by 0.309 and 0.633per cent respectively. Regression coefficient with respect to family human labour 0.101 was positive but non significant where as regression coefficient was hired human labour of -0.235 showed negative and non significant.

Coefficient of multiple determinations (R^2) was 0.843 which indicated 84.30 per cent variation in cocoon production due to variation in all independent variables. F-value was highly significant as 81.46. Sum of regression coefficient was 1.260 which indicated increasing return to scale. Resource productivity with respect to various explanatory variables was also calculated in table 2. It was clear that marginal productivity with respect to and use of mulberry leaves was (2.575 kg) followed by marginal product of disinfecting material (0.794 kg), family human labour (0.511 kg) and diseased free lying (0.268 kg). It inferred that if use of mulberry leaves were increased by 1 at its geometric mean level, it would lead to increase production of 2.575 kg.

Similarly with 1 unit increase in disinfecting material, family human labour and diseased free lying, it would cause to increased cocoon production by 0.794 kg, 0.511 kg and 0.268 kg respectively. The marginal productivity with respect to hired human labour was -4.642 kg which indicate that with 1 unit increase in hired human labour cause to decrease of cocoon production by 4.642 kg. In regard to resource use efficiency, use of disease free layings indicated MVP to price ratio as (6.97) followed by that of mulberry leaves (5.43), disinfecting material (4.81), and family human labour (0.93). It inferred that there was scope to increase use of mulberry leaves, disease free layings, disinfecting material and family human labour on priority basis because of higher MVP to price ratio. In other words use of mulberry leaves, disease free layings, disinfecting material and family human labour, were found, under-utilization and hence there is need to increase these resources in cocoon production.

Conclusion

In regard to employment generation in sericulture is considered to be principle cash business in the study area, which generates employment throughout the year. Sericulture offer employment to the extent of 467.45 man days, out of which 207.57 where the male days, and 259.88 where the female days, for the area of 1 hectares. Sericulture is female labour oriented economic activity in the rural areas. The sex ratio in labour participation in the sericulture was 01:01:80, through the sex ratio it is clear that female labour participation is much higher in sericulture than male labour participation, thus sericulture prove best among rural poverty irradiation in the rural areas of the region. Coefficient of multiple determinations (R^2) was 0.843 which indicated 84.30 per cent variation in cocoon production due to variation in all independent variables. F-value was highly significant as 81.46. Sum of regression coefficient was 1.260 which indicated increasing return to scale. Resource productivity with respect to various explanatory variables concluded that marginal productivity with respect to and use of mulberry leaves was (2.575 kg) followed by marginal product of disinfecting material (0.794 kg), family human labour (0.511 kg) and diseased free lying (0.268 kg). It inferred that if use of

mulberry leaves were increased by 1 at its geometric mean level, it would lead to increase production of 2.575 kg. In regard to resource use efficiency, use of disease free layings indicated MVP to price ratio as (6.97) followed by that of mulberry leaves (5.43), disinfecting material (4.81), and family human labour (0.93). It inferred that there was scope to increase use of mulberry leaves, disease free layings, disinfecting material and family human labour on priority basis because of higher MVP to price ratio. In other words use of mulberry leaves, disease free layings, disinfecting material and family human labour, were found, under-utilization and hence there is need to increase these resources in cocoon production.

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