

Original Research Article

<https://doi.org/10.20546/ijcmas.2020.908.103>

## Adoption Pattern of Mulberry Cultivation and Silkworm Rearing in the Eastern Dry Zone of Karnataka, India

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### ABSTRACT

#### Keywords

Mulberry,  
Silkworm,  
Respondents and  
Eastern dry zone

#### Article Info

Accepted:  
10 July 2020  
Available Online:  
10 August 2020

Cultivation of mulberry and rearing of silkworms are the farm based activities managed by the silk cocoon producers. It is possible to harvest five to eight crops per year in the tropical areas. Sericulture has been practiced on small or medium sized holdings in India. The study was conducted in Chikkaballapura District, which lies in the Eastern dry zone of Karnataka state. It is situated in the interior of the Deccan Peninsula and lies between the 77° 14' to 78° 04' East longitude and 13° 24' to 13° 48' North latitude. A total of 120 respondents were selected randomly comprising of marginal, small and big farmers from Chintamani and Shidlaghatta Taluk from entire district and the data collected during the period of March- April, 2017. Among 120 respondents, 68.33 per cent of the respondents were between the age group of 36-50 years, 30 per cent were illiterate and 70 per cent were educated. Majority of the farmers cultivating Victory-1 mulberry variety and practicing shoot rearing. The marginal farmers practicing silkworm rearing in dwelling house whereas small and big farmers were in separate rearing house. Majority of the farmers are procuring the silkworms from the chawki rearing centers (CRCs) and the breed was PM X CSR<sub>2</sub> (cross breed).

### Introduction

Sericulture' is an art and science of rearing of silkworms to produce cocoons and silk. This activity, apart from the rearing of silkworms, also involves growing of mulberry, reeling of silk thread from cocoons, weaving the silk yarn and further processing to produce the silk fabric. Sericulture is an important means for the socio-economic development of the rural sector. It is a highly labour intensive, profit oriented, low input indoor activity that

gives frequent periodicity of economic returns. It is also well suited for the women folk of rural sector.

Sericulture is an agro based industry, par excellence with its agricultural base, industrial super structure and labour intensive nature. It a subsidiary occupation, technological innovation has made it possible to take it up on an intensive scale capable of generating adequate income. To produce quality cocoons, farmers need to acquire

knowledge about new technologies and also show interest to adopt such technologies in the field. It is observed that most of the farmers are reluctant to adopt recommended new technologies due to various socio-economic and biological factors (Lakshmanan *et al.*, 1998).

Sericulture industry concerned with the production of silk is divided into seven phases, *viz.*, cultivation of mulberry, silkworm seed production, rearing of silkworm, reeling of raw silk twisting, dyeing and weaving of silk. Cultivation of mulberry and rearing of silkworms are the farm based activities managed by the silk cocoon producers. It is possible to harvest five to eight crops per year in the tropical areas. Although, sericulture has been practiced on small or medium sized holdings in our country, the remunerative return from sericulture has enabled a few large-scale ventures also.

### **Materials and Methods**

The study was conducted in Chikkaballapura District, which lies in the Eastern dry zone of Karnataka state. It is situated in the interior of the Deccan Peninsula and lies between the 77° 14' to 78° 04' East longitude and 13° 24' to 13° 48' North latitude. The geographical area of Chikkaballapura district is 4, 04, 501 ha.

A total of 120 respondents were selected randomly comprising of marginal, small and big farmers from Chintamani and Shidlaghatta Taluk from entire District. The data collected during the period of March-April, 2017.

### **Selection of respondents**

A total of 60 respondents were selected randomly comprising of marginal, small and big farmers from Chintamani and

Shidlaghatta Taluk are selected from entire district.

### **Nature and source of data**

These Sericulturists were interviewed personally by using a schedule prepared for the purpose. Data pertaining to Sericulturists socio-economic characteristics, land holdings, cropping pattern, source of silkworm breeds, day of cocoon harvest, type of rearing house, input use, total output and prices, input availability and opinions of the Sericulturists on yields were collected.

Every effort was made at the time of the interviews to convince the respondents that the study was undertaken purely for research purpose and the information provided would not be used for any other purpose. Keeping in view the objectives of the study, the data collected from the respondents during the period of March- April, 2017.

### **Results and Discussion**

#### **Age and education level of the farmer respondents**

The majority of the marginal respondents were between the age groups of 36-40 (10 per cent) and below 30 years (10 per cent). Respondents of small farmers in the age group of more than 50 were 10 per cent and age group between 41 to 45 years were 8.33 per cent, followed by < 30 and 31 to 35 years were 3.34 and 3.34 per cent respectively. It is also observed that majority of the big farmer respondents were between the age group of 31 to 35 (5 per cent) and more than 50 years (5 per cent) followed by 36 to 40 (3.34 per cent) and 46 to 50 years of age (3.34 per cent) (Table 1).

A majority of the respondents were literates (70 per cent). Out of the 60 sample

respondents, 18 were illiterate, 12 had completed primary education, 23 had completed high school, 01 had completed pre-university education and 06 respondents were graduates. In Chikkaballapura district 30 per cent of the farmers were illiterates (Table 2).

### **Mulberry holding pattern of farmer respondents**

On the basis of land holdings of the farmer respondents (60), the stakeholders were classified into three categories. The respondents 38.33 per cent of their land under mulberry fall in below 1 acre. The results revealed that majority of respondents 43.34 per cent fall in 1 to 2 acre size of mulberry land holdings, whereas only 18.33 per cent of stakeholders came under 2 acres and above (Table 3).

Results of an interview of 150 Sericulturists in Anantapur district, Andhra Pradesh revealed that, the adoption level among different categories of farmers was in the order of big farmers > small farmers > marginal farmers (Sujatha *et al.*, 2006a).

### **Type of purchase of DFLs**

Sericulturists of this region buy the layings in three different modes 1. Private grainages, 2. Government grainages and 3.CRCs (Chawki Rearing Center). The dfls (disease free layings) have its own role on the quality of silkworm and cocoon production. The excellent is the dfls, the yield of cocoon quality will be the high.

Out of 60 respondents, silkworm rearers (10 per cent) will be procuring the dfls from the government and some 28.24 per cent purchase in the licensed private grainages. The majority of the sericulturists purchase the DFLs (Chawki silkworms) from the chawki rearing centers (61.66 per cent) in the district (Table 4).

These results were on par with the results of R. S. Umakanth *et al.*, (2014), a study of sericulturists or survey reveals that majority of farmers procuring the dfl's from CRCs established under SGSY project in a village of Chamarajanagar District.

The study was supported by Gururajet *al.*, (2007) who reported that, the sericulture at Kodagapura: a case study that the sericulturists who switched over to PM x CSR<sub>2</sub> (as it was better yielder hence, more remunerative) in Kodagapura village recorded a cocoon yield of 52.22 Kgs/100 dfls and showed an improvement of 10 Kg (26.3 per cent) over the bench mark cocoon yield of 41.32 Kgs/100 dfls and earned better returns of Rs. 1800-2500/ 100 dfls after launch of Institute Village Linked Programme (IVLP) in 2004-05.

### **Accommodation provided for silkworm rearing**

An ideal house with a separate room for rearing, a place for storing mulberry leaf, place for keeping rearing appliances, place for incubation and the mountages maintenance with the spinning larva.

Most of the commercial rearers in the district are the small land holders dependent on sericulture occupation for drawing their livelihood with insufficient dwelling units followed by poor infrastructure facilities; therefore most of them use a part of their dwelling unit for the silkworm rearing purpose, this follows rearing unit cum living house.

The accommodation provided by the respondents for silkworm rearing in the sample villages of the district were depicted in table 5. As results revealed that, out of a total of 60 sample Sericulturists, 36.66 per cent (22) rear silkworm in their dwelling

houses, 58.34 per cent (35) rear silkworm in a separate house and a negligible amount of farmers 3(5%) dependent on other places.

Of the total, marginal farmers 18.34 per cent (11) and small farmers 16.66 per cent (10) whereas in big farmers 1.67 per cent (1) of sericulturists do not have any separate rearing place, however, they manage to rear within their dwelling houses itself.

About 25 per cent (15) of small farmers rear in a separate house followed by marginal and big 16.66 per cent each (10, 10) respectively. Whereas 5.01 per cent of farmer respondents rearing in other places (Mulberry garden) in the district.

The reasons for rearing of silkworms within the dwelling house were presented in the table 5. The problems are summarized in three types; financial problems, no site or vacant place for the construction of rearing house

and disregard. Most of the marginal farmers are reported under their financial problems and no site for construction of rearing house followed by small and big farmers, invariably in the taluks.

Rearing of silkworm within the dwelling unit is the expression of their inability to have a separate house, but the living house is not an ideal place for these purposes, the cooking process continues to damage the young silkworms and the production of cocoons decrease, ultimately farmer face the loss in both yield and quality.

The study was confirmed by the findings of Ramakrishna (1987) in his study on silk cocoon production in Karnataka, indicated that uzifly incidence was the major problem in cocoon production, which was reported by all the respondents, while 97 per cent of the respondents expressed their inability to have separate rearing house.

**Table.1** Age of the farmer respondents

Age in years	Marginal	Small	Big
<b>Below 30</b>	6	2	1
<b>31-35</b>	5	2	3
<b>36-40</b>	6	4	2
<b>41-45</b>	4	5	1
<b>46-50</b>	0	4	2
<b>&gt;50</b>	4	6	3
<b>Total</b>	<b>25</b>	<b>23</b>	<b>12</b>

**Table.2** Education level of the farmer respondents

Education level	Marginal	Small	Big
<b>Illiterate</b>	9	7	2
<b>Primary</b>	3	7	2
<b>High school</b>	9	11	3
<b>PUC</b>	0	0	1
<b>Degree</b>	1	3	2
<b>Total</b>	<b>22</b>	<b>28</b>	<b>10</b>

**Table.3** Mulberry holding pattern of farmer respondents

Size of mulberry land	No. of farmers
Below 1 acre	23
1 to 2 acre	26
2 acre & above	11
<b>Total</b>	<b>60</b>

**Table.4** Type of purchase of DFLs

Source of DFLs	No. of farmers
Government grainage	6
Private	17
CRCs	37
<b>Total</b>	<b>60</b>

**Table.5** Type of rearing house for silkworms

Category of farmers	Dwelling house	Separate house	Other places
Marginal	11	10	1
Small	10	15	1
Big	1	10	1

**Table.6** Adoption pattern of mulberry cultivation and silkworm-rearing practices by the sample farmers

Sl. No	Practice	Full adoption		No adoption	
		No	%	No	%
1	Improved mulberry variety	60	100	00	00
2	Manure	60	100	00	00
3	Chemical fertilizers	53	88.33	07	11.67
4	Weeding	42	70	18	30
5	Fertigation	45	75	15	25
6	Scientific method of rearing house	36	60	24	40
7	Proper Disinfection	43	71.67	17	28.33
8	Hygiene practices	30	50	30	50
9	Shoot rearing	60	100	00	00
10	Bed cleaning	54	90	06	10
11	Temperature & humidity maintenance	39	65	21	35
12	Control of mulberry pests	45	75	15	25
13	Management of uzifly	60	100	00	00

### **Adoption pattern of mulberry cultivation and silkworm-rearing practices by the sample farmers**

In the district selected for the study, 100 per cent of the farmers were raising improved mulberry variety. In general, only 100 per cent of the stakeholders have adopted technology of cultivating improved mulberry variety. However, 75 per cent of farmers subject their mulberry garden to fertigation and remaining 25 per cent had not adopted the technology. In regard to weeding of mulberry garden and application of chemical fertiliser dose to it, the results registered were 70 and 88.33 per cent had fully adopted.

The results revealed that majority of the farmers viz. 75 per cent, had adopted the plant protection measures and remaining 25 per cent did not adopted any measures. Application of FYM constitute indispensable operations in quality mulberry leaf production. The results revealed that 100 per cent of farmers apply FYM to mulberry plants after harvesting of their mulberry garden.

The management during silkworm rearing has a great influence upon success and quality cocoon crop production. The disinfection of rearing house and the rearing equipments thereof is the foremost requirement. As per the results, all the stakeholders disinfect their rearing houses and even larvae by using different kinds of bed disinfectants, yet the values regarding adoption of scientific method of disinfection were 71.67 per cent of the respondents adopt it fully and remaining 28.33 per cent were not adopted (Table 6).

Even during silkworm rearing 50 per cent of the respondents adopted hygiene practices fully whereas remaining 50 per cent are not adopted. The results however indicated that only 90 per cent of farmers fully adopted silkworm bed cleaning whereas 10 per cent of

them did not adopted. 100 per cent of farmer respondents were subjected their silkworms following the shoot method of rearing with paying attention to recommended type of shoot rearing.

About 100 per cent respondents practised the management of silkworm uzifly. The results revealed that 60 per cent respondents fully adopted recommended scientific method of silkworm rearing house whereas 40 per cent of the respondents did not adopt the technology. The results revealed that 65 per cent of farmers have fully adopted whereas 35 per cent of respondents did not adopt pertaining to maintenance of temperature and humidity in the silkworm rearing house (Table 6).

Ramakrishna (1987) in his study on silk cocoon production in Karnataka, indicated that uzifly incidence was the major problem in cocoon production, which was reported by all the respondents, while 97 per cent of the respondents expressed their inability to have separate rearing house. Incidence of muscardine and grasserie were reported by 85 per cent and 81 per cent of the farmers. With regard to marketing, 93 per cent of the farmers were unhappy with weightment of cocoons and 87 per cent of the respondents suspected the existence of an illegal collusion between buyers and bidding agents.

Gopala (1991) studied the adoption of recommended practices in developed and less developed areas of Kolar district, Karnataka and concluded that there was significant difference in the overall adoption among the two categories.

Kerutagi *et al.*, (1994) identified the constraints in silk cocoon production in their study on problems of sericulture enterprises in Bijapur district, Karnataka. The constraints identified include the incidence of pests (Uzi

fly) and diseases, water scarcity in the summer months, excess heat in summer. They also suggested some measures to overcome these constraints like Uzifly can be prevented using individual tray covers of nylon mesh, proper disinfection of all the materials used in the silk cocoon production and rearing of silk worm in huts and mud houses to control excess heat during summer.

In conclusion, about 68.33 per cent of the respondents were between the age group of 36-50 years and 30 per cent of the respondents were illiterate and 70 per cent of the respondents were educated in the study area. Majority of the farmers in the study area cultivating V1 mulberry variety and practicing shoot rearing. The marginal farmers practicing silkworm rearing in dwelling house whereas small and big farmers were in separate rearing house. Majority of the farmers are procuring the silkworms from the chawki rearing centers (CRCs) and the breed was PM X CSR<sub>2</sub> (cross breed). Farmers usually harvest the cocoons on 4<sup>th</sup> day during summer, whereas, 5<sup>th</sup> and 6<sup>th</sup> day during the rainy season.

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## How to cite this article:

Murali, N., R. S. Umakanth and Anitharani, K. V. 2020. Adoption Pattern of Mulberry Cultivation and Silkworm Rearing in the Eastern Dry Zone of Karnataka, India. *Int.J.Curr.Microbiol.App.Sci.* 9(08): 953-959. doi: <https://doi.org/10.20546/ijcmas.2020.908.103>