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RESEARCH PAPER

Adoption of sericulture production technologies in northern Karnataka

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Abstract: Livelihood generation is one of the major potentials of sericulture and silk industry. Sericulture has emerged as the most important allied agricultural activity with minimum investment, low gestation period, high employment potential high profits. Sericulture has provided downstream employment, income generation for low income and socially under privileged groups in rural and semi-urban areas. Sericulture involves simple technologies which are easy to understand and to adopt. Sericulture being a cottage industry and a family affair, most of the sericulture activities are indoor. It provides ample work opportunities for both women and men in rural areas along with agriculture and allied activities. Therefore, a research study was conducted to know the differences in adoption of sericulture production technologies among selected districts *viz.* Bagalkot, Belagavi and Haveri of Northern Karnataka during the year 2018-2019 which are emerging as the promising districts for cultivation of sericulture. Results revealed that majority of sericulture farming families belonged to high adoption category with respect to all dimensions of adoption such as silkworm rearing (91.67%), mulberry leaf production (77.00 %) and mulberry nursery raising (70.67%). The significant difference was found among the selected districts in adoption of sericulture production technologies. Mean values among three districts ranged from 25 to 32. The mean value of Bagalkot district was found to be highest (32.57) followed by Haveri (26.60) and Belagavi (25.85). The scores indicated the Bagalkot families adopted more number of technologies compared to other two districts. This study shows that adoption level of improved methods of sericulture technologies was low for crucial sericulture practices. It calls for the extension agency to educate the farmers, by way of home visits, field days, discussions, training and demonstrations about improved methods of mulberry cultivation and silkworm rearing, thereby enabling farmers to adopt new technologies to increase mulberry leaf production, cocoon productivity with higher monetary return, Northern Karnataka.

Key words: Cocoon, Mulberry technology, Sericulture, Silk

Introduction

Sericulture is a village-based industry practiced in about 54000 villages and provides employment to about 6 million people (Santosh Kumar, 2017). Moreover, it is capable of providing continuous income to farmers. Sericulture suits both marginal and small-scale land holders because of its low investments, high assured returns, short gestation period, rich opportunities for enhancement of income and creation of family employment round the year. In India, due to favourable climatic conditions, mulberry is cultivated mainly in Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Jammu and Kashmir. These five states collectively account for 97% of the total area under mulberry cultivation and 95 per cent of raw silk production in the country.

The country has produced a record level of 31,906 MT of raw silk during 2017-18. During the same year, import substitute (bivoltine) raw silk production has recorded 11.5% growth over the previous year (2016-17) indicating the intense interest of farmers in producing bivoltine rather cross breed cocoons, through good performance of the industry. Out of the total silk production in India, Karnataka accounted for about 54.50 per cent. Karnataka has been the leading producer of mulberry silk-accounting for more than 50% of its production in the country. This state is now regarded as the "Silk Bowl of India. At present, the area under mulberry plantation in the state is 98,135 hectares with mulberry raw silk production of 9322 MT with around 30 per cent of country's raw silk production. The major cocoon production is coming from the southern districts of Bengaluru Urban, Bengaluru Rural, Ramanagara, Mandya, Mysuru, Chamrajnagar, Chickballapur and Kolar. In the recent past, Tumkur, Chitradurga, Bellary, Haveri, Bagalakot, Belagavi and Gadaghad taken up sericulture in a big way as the non-traditional occupation (CSB 2019).

Material and methods

The study was conducted in Bagalkot, Belagavi and Haveri districts of Northern Karnataka state coming under the jurisdiction of UAS, Dharwad, during 2018-2019. Among the three districts, two taluks from each district and from each taluk, two villages were selected withhighest sericulture area and more number of sericulturefamers. Hence a total of 12 villages were selected (100 sericulture farming families from each district).Thus, a of 300 sericulture farming families/households were selected from the 12 villages using simple random sampling technique. The improved package of practices for sericulture production technologies suggested by UAS, Dharwad and Sericulture department of GoK were considered to study the adoption. The experts/scientists in the field of sericulture productionwere consulted to study the adoption of sericulture production technologies by the farmers.The adoption was studies under different domains of sericulture production activities including selection of varieties to cultivate mulberry to till production

and harvesting of cocoons . Correlation test was used to know the relationship between socio-personal characteristics and adoption of sericulture production technologies of respondents. ANOVA technique was used to compare the adoption level of sericulture production technologies among the selected three districts of northern part of Karnataka.

Results and discussion

The result in Table 1 depicts the adoption of sericulture production technologies under different domains of sericulture production activities including selection of varieties to cultivate mulberry till production and harvesting of cocoons Cent per cent of sericulture farming families planted V1-mulberry variety with proper length and appropriate buds per cuttings. Whereas 96.63 per cent have adopted nursery rearing by using cuttings, 90.00 per cent adopted proper irrigation methods and 84.00 per cent maintained proper spacing between mulberry plants plantation. Adoption of weeding practices was found to be less in Belagavi (37.00%). It was high in Bagalkot (53.00%) followed by Haveri (64.00%) district. The overall adoption index was 85.58. The adoption index was 88.25 in Bagalkot district, 87.50 in Haveri district and in Belagavi 81.00 district.

Adoption scores on mulberry leaf production indicated that, cent per cent of sericulture families had separate chawki garden followed by 93.67 per cent applying correct proportionate of FYM. Whereas, more than 80.00 percent of the sericulture families have adopted proper spacing, intercultural operations and appropriate methods of pruning. Disease and pest management practices have been adopted by 70.67 per cent of the sericulture families. In all the three districts the adoption index was found to be 90.50 in Bagalkot district followed by Haveri (85.16) and Belagavi (81.67)

Table 1 also indicates that all the (cent per cent) families adopted disinfection of rearing house and rearing beds, chawki rearing, shoot feeding method and plastic mountages for cocoon constructions. Majority of the (98.67%) families following appropriate feeding methods, 93.67 per cent of them rearing bivoltine variety and 84.67 picking the cocoons within specified period of time. Adoption indices showed sericulture families

Table 1. Adoption of sericulture production technologies by sericulture farming families n=300

Sl. No.	Technology Component	Bagalakot (n1=100)		Belagavi (n2=100)		Haveri (n3=100)		Total (n=300)	
I	Mulberry Nursery Raising	f	%	f	%	f	%	f	%
1	V1 mulberry variety and mulberry varieties suitable for area	100	100.00	100	100.00	100	100.00	300	100.00
2	Nursery raising by cuttings	100	100.00	89	89.00	100	100.00	289	96.33
3	Length of cuttings used (7-8 cm)	100	100.00	100	100.00	100	100.00	300	100.00
4	Number of buds per cutting(3-4)	100	100.00	100	100.00	100	100.00	300	100.00
5	Spacing (3"*3", 3"*4")	87	87.00	76	76.00	89	89.00	252	84.00
6	Irrigation (2-3 in a week)	91	91.00	89	89.00	93	93.00	273	91.00
7	Weeding with weedicides	64	64.00	37	37.00	53	53.00	154	51.33
8	Organic matter/ chemical fertilizer application	67	67.00	57	57.00	62	62.00	186	62.00
	Adoption index of mulberry nursery raising	87.25		81.00		88.50		85.58	
II	Mulberry leaf production								
1	Separate Chawki garden	100	100.00	100	100.00	100	100.00	300	100.00
2	Use of FYM	81	81.00	100	100.00	100	100.00	281	93.67
3	Proper spacing in garden	59	59.00	92	92.00	100	100.00	251	83.67
4	Intercultural operations	93	93.00	73	73.00	79	79.00	245	81.67
5	Pruning of mulberry plant	87	87.00	68	68.00	100	100.00	255	85.00
6	Disease and pest management of mulberry garden	91	91.00	57	57.00	64	64.00	212	70.67
	Adoption index of mulberry leaf production	90.50		81.67		85.16		64.33	
III	Silkworm rearing								
1	Disinfection of rearing houses	100	100.00	100	100.00	100	100.00	300	100.00
2	Disinfection of larvae/rearing beds	100	100.00	100	100.00	100	100.00	300	100.00
3	Bivoltine/Multivoltine rearing	89	89.00	100	100.00	92	92.00	281	93.67
4	Temperature Maintenance	64	64.00	79	79.00	100	100.00	243	81.00
5	Adoption of chawki rearing	100	100.00	100	100.00	100	100.00	300	100.00
6	Shoot rearing method	100	100.00	100	100.00	100	100.00	300	100.00
7	Type of mounting material used	100	100.00	100	100.00	100	100.00	300	100.00
8	Disease and pest management	100	100.00	63	63.00	57	57.00	220	73.33
9	Feeding Method	96	96.00	100	100.00	100	100.00	296	98.67
10	Time of cocoon harvesting and deflossing	91	91.00	100	100.00	63	63.00	254	84.67
	Adoption index of silkworm rearing	93.87		92.75		87.62		91.41	

Table 2. Categorization of sericulture farming families based on overall adoption of mulberry cultivation and silkworm rearing n=300

Sl. No.	Dimensions ofadoption	Categories	Bagalakot (n_1=100) F (%)	Belagavi (n_2=100) F (%)	Haveri (n_3=100) F (%)	Total (n=600) F (%)
I	Mulberry nursery raising	Low (Up to 2)	-	-	-	-
		Medium(3-6)	20(20.00)	36(36.00)	32(32.00)	88(29.33)
		High (6-8)	80(80.00)	64(64.00)	68(68.00)	212(70.67)
II	Mulberry leaf production	Low (Up to 2)	-	-	-	-
		Medium(3-5)	36(36.00)	27(27.00)	6(6.00)	69(23.00)
		High (5-6)	64(64.00)	73(73.00)	94(94.00)	231(77.00)
III	Silkworm rearing	Low (Up to 4)	-	-	-	-
		Medium(5-8)	4(4.00)	18(18.00)	3(3.00)	25(8.33)
		High (9-12)	96(96.00)	82(82.00)	97(97.00)	275(91.67)

from Bagalkot district adopted more new and improved technologies compared to Haveri and Belagavi districts. It could be because of Bagalkot farming families had more technological knowledge about sericulture production technologies and practiced new technologies of silkworm rearing. They had high consultancy pattern with sericulture department and participated in more number of training programmes.

Table 2 reveals that that majority of sericulture families belonged to high adoption category with respect to all dimensions of adoption such as silkworm rearing (70.67%), mulberry leaf production (77.00%) and mulberry nursery rearing practices(70.67%).

Table 3 showed that 73.00 per cent of sericulture families belonged to high category and 27.00 per cent of the sericulture families were found in medium category of adoption sericulture production technologies.

It is clearly seen in the Table 4 that, independent variables such as experience, annual income, extension participation and mass media participation were significantly related with adoption of sericulture production technologies at 1 per cent level of probability. Other variables such as age, size of family and land holdings were negatively related and non-significant. Education, organizational participation and source of information were positively correlated with adoption level sericulture production technologies. As the experience increases income of the family increased, respondents gained more knowledge, motivated to know and adopt new practices of sericulture production technologies. Similarly, more participation in extension activities and utilization of mass media to get the information regarding sericulture technologies increased their adoption. These findings were in consonance with the findings of Sreenivasa and Hiriyanna (2007).

The overall results obtained through the analysis with ANOVA (Table 5) in the study clearly indicated that there is a

Table 3. Categorization of sericulture farming families based on overall adoption of sericulture technologies n=300

Categories	F	%
Low (0-9)	-	-
Medium (10-18)	81	27.00
High (19-78)	219	73.00

Table 4. Relationship between socio-economic characteristics and adoption of sericulture production technologies

n=300

Sl. No.	Independent Variables	Bagalakot (n_1=100)	Belagavi (n_2=100)	Haveri (n_3=100)	Total (300)
1	Age	-0.068	-0.004	-0.037	-0.006
2	Education	0.094	0.204*	0.043	0.008
3	Experience	0.227	0.074	0.226*	0.273**
4	Size of family	-0.143	0.037	0.078	-0.052
5	Land holding	-0.137	-0.014	0.205*	-0.051
6	Annual income	0.054	0.058	0.101	0.430**
7	Organisational Participation	0.009	0.104	0.131	0.056
8	Extension Participation	0.070	0.035	0.085	0.307**
9	Source of Information	0.097	0.050	0.008	0.002
10	Mass media Participation	0.047	0.018	0.025	0.158**

** Significant at 0.01 level

* Significant at 0.05 level

Table 5. ANOVA to compare mean scores of adoption level of sericulture farming families n=300

Districts	Men (n_1=300)			
	Mean	F-value	SEM	CD
Bagalakot (n_1=100)	32.57	87.85*	0.404	2.49
Belagavi (n_2=100)	25.85			
Haveri (n_3=100)	26.60			

* Significant at 0.05 level

S.E - Standard Error

C.D - Critical Difference

significant difference among selected districts in adoption of sericulture production technologies among sericulture familiesin adoption of sericulture production technologies with a critical difference value of 2.49. Mean values of different districts ranges from 25-32. The mean value of Bagalkot district was found to be highest *i.e.* 32.57 followed by Haveri (26.60) and Belagavi (25.85). These scores indicated Bagalkot districtsericulture familieshave adopted morenumber technologies compare to other two districts. The reason could be that more number of men and women of Bagalkot district were found to be in young aged category and they were literates. Men and women from sericulture farming families from Bagalkot district were enthusiastic and actively involved in trainings, exhibitions and other sericulture extension activities conducted by Sericulture department. Hence their knowledge was also more about sericulture activities.Therefore, their adoption level was found to be high

in Bagalkot district.Younger farmers exhibited high level of knowledge about the sericulture production technologies as compared to older farmers. This result was in consonance with the findings of Choudhury *et al,* 2017.

Conclusion

Northern Karnataka is emerging as the promising area for sericulture.As the sericulture is a family affair and every member of a family plays a very important role in sericulture production activities, it is very much essential to plan and implement sericulture promoting activites taking in to consideration their socio-personal profile.In view of doubling the farmers income,it is suggested through this study that, there is a need to expand the area under sericulture in other parts of north Karnataka. Hence well-plannedextension activities basedon whole family approachand approaches with group/ community farming, farmer field schools, demonstrations can be implemented. The income is already assured with high returns on sustainable basis which can motivate the other farmers to incline towards sericulture.Better access to the market placeis to be considered as north Karnataka is lacking better marketing facility compared to south Karnataka. It also calls for the extension agency to educateand to crate positive attitude towards sericulture by way of home visits, field days, discussions, trainings and demonstrations about improved methods of mulberry cultivation and silkworm rearing, thereby enabling farmers to adopt new technologies to increase mulberry leaf production, cocoon productivity and get better monetary benefits.

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