Knowledge Assessment of Beneficiary Farmers of Technical Service Centres (TSCs) about Recommended Technologies of Sericulture in Karnataka State of India

Abstract

Sericulture in Karnataka is in the process of modernization in many phases through new demand driven extension approach called Technical Service Centres (TSCs) located at the grass-root level (Hobli and Taluka level). These centres are mainly involved in the dissemination of the technologies developed by the Research Institutes and also in supply of mulberry cuttings/saplings, monitoring mulberry cultivation, silkworm rearing and providing information about loan facilities and subsidy schemes. There is a need to study the attitude of sericulture beneficiary farmers towards activities of TSCs. The study was conducted during 2018-20 in the Karnataka state whichcontribute 35 per cent of silk production in India. An *ex-post facto research design* was used or the study. Knowledge test was constructed to measure the knowledge of sericulture farmers on recommended sericulture technologies.The Ramanagara and Mandya districts were selected because these districthave highest number of TSCs in Bangalore and Mysore division respectively.Mandya, Malavalli and K.R Pet taluks from Mandya district as well asRamanagara, Channapatna and Kanakapura taluks from Ramanagara district were selectedfor the study with four TSCs from each taluk. Totally, 24 TSCs were selected for the study.Ten sericulture farmers under each TSC, collectively 240, were selected by using random sampling method. The study highlighted that more than half (52.50%) and more than one third (36.25%) of the sericulture farmers had medium and high knowledge on recommended technologies of sericulture respectively. Only just more than one tenth (11.25%) of the sericulture farmers had lowknowledge on recommended technologies of sericulture. The probable reason might be due to fact that sericulture farmers were regularly consulting from officials of grainage centres, TSC extension functionaries, input dealers and peer group about the information on latest sericulture technologies.

Keywords: Farmers, Knowledge, Sericulture, mulberry cultivation, cocoons

Introduction

Sericulture is an agro-based, labour intensive, export oriented commercial activity. Sericulture which was considered as a subsidiary occupation in the past is now being considered as major activity and farmers are willing to take-up large-scale sericulture.

Itprovides an ideal livelihood opportunity for millions of women without disturbing their household work. Silkworm rearing can generate regular employment for 12-13 persons per ha with low investment and a short gestation period of six months.

In 2018-19, under global scenario, China was the leading silk producer (1,20,000 MT) followed by India (35,461 MT), Uzbekistan (1,800 MT), Thailand (680 MT), Vietnam (680 MT), Brazil (650 MT), North Korea (350 MT) and Turkey (30 MT). The major silk consumers of the world are United States of America (USA), Italy, Japan, India, France, China, United Kingdom, Switzerland, Germany, United Arab Emirates (UAE), Korea, Vietnam, etc.(International Sericultural Commission, 2020).

The annual raw silk production reached a record high of 35,468 MT during 2018-19, of which, mulberry raw silk production aggregated to 25,345 MT (71.50 %) and the remaining 10,124 MT (28.50 %) was *Vanya* silks. As per 2018-19, the Karnataka (11,592 MT) is leading producer of silk followed by Andhra Pradesh (7481 MT), Assam (5026 MT) West Bengal (2394 MT), Tamil Nadu (2032 MT) and Meghalaya (1187 MT). (Central Silk Board, 2018-19).

In case of mulberry cultivation, Karnataka state (104578 ha.) is having highest mulberry cultivated area followed by Andhra Pradesh (41915 ha.), Tamil Nadu (20128 ha.) and West Bengal (15400 ha.) The silk exports registered a quantum jump of Rs.2031.88 crore in 2018-19 from Rs.1649.48 crore in 2017-18. (Central Silk Board, 2018-19)

In Karnataka, sericulture is considered as main occupation by 1, 25, 545 farmers of the state. For the year, 2018-19, Karnataka produced 11,592 MT of silk with 1, 04,578 ha area under mulberry cultivation and produced 70,436.14 MT of cocoons. The Mandya district (15,483 MT) was in first place in cocoon production followed by Chickballapur (13,656 MT), Kolar (12,770 MT) and Ramanagara (12,742 MT). (Department of Sericulture, Karnataka, 2018-19).

Sericulture is considered as main employment and income generating activity in Karnataka. The Technical Service Centres (TSCs) are playing an incredible role of extension for wellbeing of sericulture farmers through their extension activities.These are the front line units and they motivate the farmers to take up mulberry cultivation and silkworm rearing. The TSC is the distinctive extension system established at grass root level, which are easily accessible to farmers and helps to disseminate knowledge and make them adopt the scientific technologies of mulberry cultivation and silkworm rearing. The extension efforts of TSCs are evident for increasing production, productivity and quality of mulberry and cocoons. There is

the need of refinement and reformation of extension methodologies of TSCs. It will also help to ascertain the efficacy of TSC extension personnel by measuring knowledge of recommended technologies of mulberry and silkworm rearing among sericulture beneficiary farmers. Furthermore, there is a scope for extension system to diffusethe sericulture technologies to the non-sericulture growing areas and to become agriculture as a profitable sector and none of the research studies were conducted on sericulture extension system (TSCs). Hence, the present investigation was undertaken.

Material and Methods

The study was conducted during 2018-20 in the Karnataka state of India. The *Ex-post-facto-research design* was used for the study.This method was considered appropriate because the phenomenon has already occurred. The Ramanagara and Mandya districts were selected because these district having highest number of TSCs in Bangalore and Mysore division respectively.Mandya, Malavalli and K.R Pet taluks from Mandya district on the other hand Ramanagara, Channapatna and Kanakapura taluks from Ramanagara district were purposively selectedfor the study.Above taluks were selected based on top 3 taluks in TSCs in district.The four TSCs from each taluk led to twelve from each district, Totally, 24 TSCs were selected for the study.Ten sericulture farmers under each TSC, thus collectively 240 were selected by using random sampling method.A well structured interview schedule was used for data collection. The statistical tools like frequency, percentage, mean, standard deviation were used for data analysis.

Knowledge is operationally defined ability of the sericulture beneficiary farmers of TSCs to recall or recollect the learned facts, information, abilities, skills acquired through experience and education about sericulture enterprise. The knowledge on sericulture technologies was measured through construction of knowledge test. A comprehensive list of knowledge questions on sericulture practices in the study area were prepared by consulting Department o sericulture, Package of Practices of sericulture by Central Silk Board, books and discussion with extension personnel working in the study area. There were 85 items selected for developing knowledge test, after editing carefully and by subjecting them to expert's endorsement. The items selected for the construction of knowledge test on recommended practices of sericulture were framed in the objective form viz., multiple choice, fill in the blanks, true or false and yes or no. The items selected for the knowledge test were

pre-tested separately by administering the items to 30 sericulture farmers. Care was taken to select the matching sample of 30 sericulture farmers from non sampling area.

Item Analysis: Items were rank-ordered, based on which, they were then divided into six equal groups. These groups were labelled as G1, G2, G3, G4, G5 and G6 with five farmers in each group. For the purpose of item analysis, middle two groups G3 and G4 were eliminated keeping only four extreme groups with high and low scores.After getting the four extreme groups for item analysis, the responses for each of the items were subjected to calculate difficulty index, discrimination index and point biserial correlation

The item difficulty index was worked out as the percentage of sericulture farmers answering for items correctly. The assumption of the item difficulty index was that, the difficulty is linearly related to the level of sericulture farmer's knowledge about production technologies of mulberry and cocoons. The items with 'P' values ranging from 0.20 to 0.80 were considered to selection of items for final knowledge test.

Discrimination index ($E^{\frac{1}{3}}$): The items with $E^{1/3}$ value ranging from 0.2 to 0.8 were considered for the final selection of items for knowledge test.

Point biserial correlation (rpbis): The main agenda of calculating point biserial correlation (rpbis) was to work out the internal consistency of the items i.e. the relationship of the total score to a dichotomized answer to any given item.

Items having significant point bi serial correlation at 1% and 5% level of probability were selected for final knowledge test.

Reliability and Validity: Reliability of the items was tested by using split half method. The scores obtained by odd numbers of sericulture farmers were taken as one set of values and the scores of even numbers of sericulture farmers as the second set of values for calculating the correlation coefficient. The correlation co-efficient (r=0.698) was highly significant indicating a high degree of dependability of the instrument for measuring knowledge of the sericulture farmers.

The content validity of knowledge test was derived a long list of test items representing the whole sericulture enterprise collected from various sources such as package of practices of Sericulture from Central Silk Board, Books, and after discussion with experts . It was assumed that the score obtained by administering the knowledge test of this study

measures extent of knowledge of farmers on their recommended scientific sericulture practices.Thus, the knowledge test developed to measure the knowledge of sericulture farmers on recommended scientific sericulture practices as it showed greater degree of reliability and validity.

Administration of the test

All the 36 items in the knowledge test read out to the sericulture farmers after establishing rapport with them. The sericulture farmers were administered with the questions included in knowledge test.

A score of 1 and 0 was assigned for correct and wrong answer for each item, respectively and the total number of correct responses given by the sericulture farmers out of the 36 items was the knowledge score obtained by him or her. Thus the maximum and minimum possible score was 36 and 0 respectively. The sericulture farmers were grouped into three categories based on mean and standard deviation as follows

List 1 :Categorisation of sericulture farmers

S. No.	Categorisation	Score
1	Low knowledge	Less than (Mean – SD)
2	Medium knowledge	Between (Mean ± SD)
3	High knowledge	More than (Mean + SD)

Results and Discussion

A bird eye view of Table 1. and Figure 1. highlighted that more than half (52.50%) and more than one third (36.25%) of the sericulture farmers had medium and high knowledge on recommended technologies of sericulture respectively. Only just more than one tenth (11.25%) of the sericulture farmers hadlowknowledge on recommended technologies of sericulture.

Table 1. Distribution of sericulture farmer according to knowledge on recommended technologies of sericulture

(n=240)

S. No.	Categorization	Frequency	Percentage
1	Low knowledge (≤26.53)	27	11.25

2	Medium knowledge (26.52- 31.74)	126	52.50
3	High knowledge (≥31.75)	87	36.25
	Total	240	100
	Mean=29.14SD = 2.61		

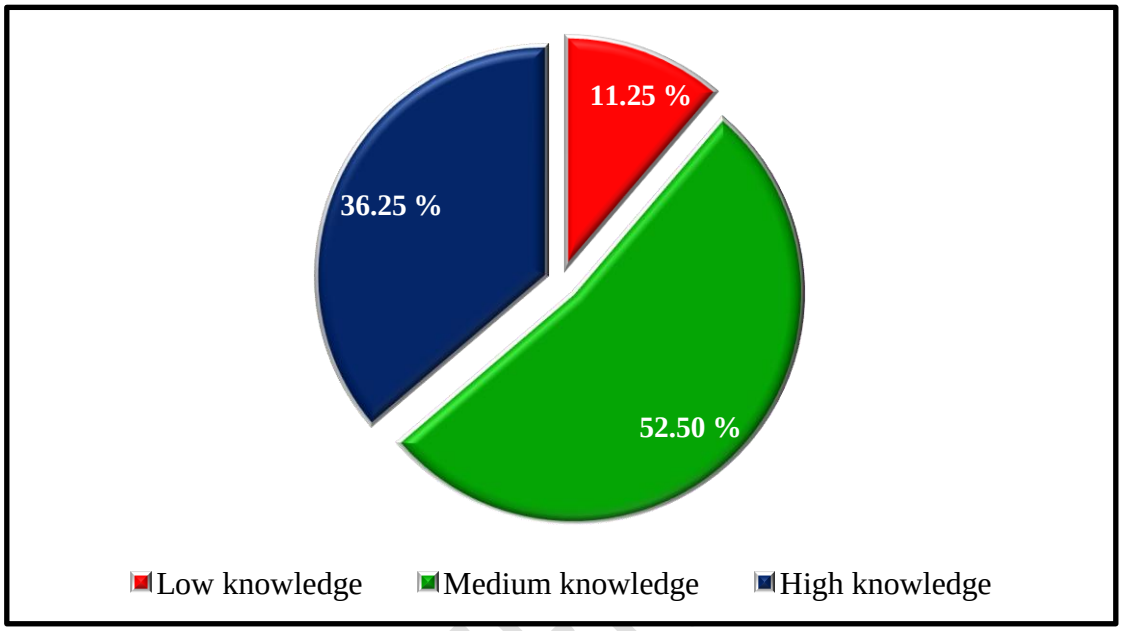

Figure 1. Distribution of sericulture beneficiary farmers according to their knowledge on recommended technologies of sericulture

An overview of the Table 2. depicted about knowledge on mulberry cultivation practices and silkworm rearing practices. With respect to mulberry cultivation

practices,equal (100.00%) per cent of sericulture farmers had knowledge about recommended practice i,e.Mulberry variety with high yielding in nature is V_1 and mulberry plant is propagation through cuttings followed by recommended quantity of manure for per hectare of mulberry cultivation is 20 tons (84.16%), Recommended quantity of N:P:K fertilizers for per hectare of mulberry cultivation is 350:140:140 (82.91%), First application of fertilizers should be applied in 3-4 weeks after pruning (81.67%), Bottom pruning method which results high yielding of mulberry (80.41%) , a disease symptom of mulberry is white powdery patches appear on the lower surface of the leaves is powdery mildew (80.00%),The 55 days older mulberry shoots prefer for feeding of silkworms (77.91%), Three feedings to silkworms in a day which gives more cocoon productivity (76.67%) and recommended spacing for paired row system of mulberry is (90 +150) × 60 cm (75.83%).

Table 2 is also inferred that nearly three fourth (74.16%) of the sericulture farmers did not have knowledge on Berseem and green manure crop for supplying additional nitrogen for mulberry cultivation followed by water discharge rate of drip irrigation in mulberry cultivation is 4-61itres/hour (69.58%), Azotobacter bio-fertilizer @ 20 Kg/ha/year fertilizers for mulberry cultivation (68.33%), Tukra disease is caused by Pink Mealy Bug (66.66%) and recommended post emergence weedicide is paraquate @2 lit/ha (60.41%), Optimum temperature for mulberry growth is 24° to 28°C (64.58%),Optimum temperature for mulberry growth is 24° to 28°C (35.42%) and one year old cuttings should be used for planting (31.25%).

Knowledge on silkworm rearing practices explained by Table 2. revealed that equal (100.00%) per cent of sericulture farmers had well knowledge about is shelf or rack rearing method is whole shoot or branch with mulberry leaves are used for feeding the silkworms and silkworm rearing house should be constructed in the direction East-West respectively followed by *Raksha Rekha*insecticidal chalk for controlling ants and cockroaches during silkworm rearing (85.83%), the worms die due to diarrheal followed by vomiting of gastric juice is the symptom of flacheries disease (83.33%), the 2 per cent bleaching powder is used to kill uzy fly eggs without affecting health of silkworm at 2^{nd} day of 3^{rd} , 4^{th} and 5^{th} instars (82.50%), disinfection of rearing house and appliances should be made before rearing with 5% bleaching powder (81.25%), optimum yield can get by rearing 100 DFLs of silkworm is 60-70 kg (80.41%), chemical solution used for spraying to the fifth instar larvae (after sample spinning) enhances the spinning behaviour is Cheatana @ 1litre/100DFLs (79.58%), recommended spacing of silkworms during spinning in mountage is 6 cm (78.75%), Uzi fly can be controlled effectively through Uzi trap than mesh method (77.50%),

after mounting, the chandrike is kept at a slanting back position of 45^0C (77.08%), recommended spacing for planting of mulberry cuttings is 20-23 cm depth (76.67**%),** most commonly used disinfectant to make rearing house as disease-free cleaning isformaldehyde36% (76.25%), ideal temperature for rearing of silkworms is 20-28°C (68.33%), After mounting, larva takes 48 hours for complete spinning of cocoon (67.50%)and Recommended dose of Vijeta powder per Sq. Feet area of bed is 10 g/Sq. Feet (63.33%).

Results from Table 2. highlighted that nearly two third (65.00%) of the sericulture farmers did not have knowledge on statement muscardine disease is fungal disease followed by net is spread over the rearing bed and shoots are fed, picking the matured larvae is called as Jabarai method (56.25%), the optimum temperature required for spinning cocoons is 25-27°C (48.34%), recommended dose of Vijeta powder per Sq. Feet area of bed is 10 g/Sq. Feet (36.67%), After mounting, larva takes 48 hours for complete spinning of cocoon (32.50%) and ideal temperature for rearing of silkworms is20-28°C (31.66%).

Table 2. Item analysis of sericulture farmer according to knowledge on recommended technologies of sericulture among beneficiary farmers of TSCs

n=240

S. No.	Statements	Yes		No	
		F	%	F	%
I	**Mulberry Cultivation**				
1	Optimum temperature for mulberry growth is 24° to 28°C	155	64.58	85	35.42
2	Mulberry variety which high yielding in nature is V_1	240	100.00	0	0.00
3	Mulberry plant is propagation through cuttings	240	100.00	0	0.00
4	Recommended quantity of manure for per hectare of mulberry cultivation is 20 tons	202	84.16	38	15.84
5	Recommended quantity of NPK fertilizers for per hectare of mulberry cultivation is 350:140:140	199	82.91	41	17.09
6	Recommended bio fertilizer for mulberry cultivation is Azotobacter @ 20 Kg/ha/year	76	31.67	164	68.33
7	Recommended spacing for paired row system of mulberry is (90 +150) × 60 cm	182	75.83	58	24.17
8	First application of fertilizers should be applied in 3-4 weeks after pruning.	196	81.67	44	18.37
9	Bottom pruning method which results high yielding of	193	80.41	47	19.59

	mulberry				
10	Water discharge rate of drip irrigation in mulberry cultivation is 4-61itres/hour.	73	30.42	167	69.58
11	One year old cuttings should be used for planting	165	68.75	75	31.25
12	Three feedings to silkworms in a day which gives more cocoon productivity.	184	76.67	56	23.34
13	The 55 days older mulberry shoots prefer for feeding of silkworms	187	77.91	53	22.09
14	Recommended post emergence weedicide is paraquate @2 lit/ha	95	39.59	145	60.41
15	A disease symptom of mulberry is White powdery patches appear on the lower surface of the leaves is powdery mildew	192	80.00	48	20.00
16	Berseem and green manure crop for supplying additional nitrogen for mulberry cultivation.	62	25.84	178	74.16
17	Tukra disease is caused by Pink Mealy Bug	80	33.34	160	66.66
II	**Silkworm Rearing**				
18	Ideal temperature for rearing of silkworms is 20-28°C	164	68.33	76	31.67
19	Raksha Rekhainsecticidal chalk for controlling ants and cockroaches during silkworm rearing	206	85.83	34	14.17
20	Most commonly used disinfectant to make rearing house as disease-free cleaning isFormaldehyde36%	183	76.25	57	23.75
21	Recommended dose of Vijeta powder per Sq. Feet area of bed is 10 g/sq. Feet	152	63.33	88	36.67
22	A type of rearing method whole shoot or branch with mulberry leaves are used for feeding the silkworms is shelf Shelf or Rack Rearing	240	100.00	0	0.00
23	Recommended spacing of silkworms during spinning in mountage is 6 cm	189	78.75	51	21.25
24	The optimum temperature required for spinning cocoons is 25-27°C	124	51.66	116	48.34
25	Recommended spacing for planting of mulberry cuttings is 20-23 cm depth	184	76.67	56	23.34
26	Uzi fly can be controlled effectively through Uzi trap than mesh method	186	77.50	54	22.50
27	Chemical solution used for spraying to the fifth instar larvae (after sample spinning) enhances the spinning behavior is Cheatana @ 1litre/100DFLs	191	79.58	49	20.42
28	Disinfection of rearing house and appliances should be made before rearing with 5% bleaching powder	195	81.25	45	18.75
29	After mounting, larva takes 48 hours for complete spinning of cocoon	162	67.50	78	32.50

30	Muscardine disease is fungal disease	84	35.00	156	65.00
31	Optimum yield can get by rearing 100 DFLs of silkworm is 60-70 kg	193	80.41	47	19.59
32	Silkworm rearing house should be constructed in the direction East-West	240	100.00	0	0.00
33	The 2% bleaching powder is used to kill uzy fly eggs without affecting health of silkworm at 2^{nd} day of 3^{rd} , 4^{th} and 5^{th} instars	198	82.50	42	17.50
34	The worms die due to diarrheal followed by vomiting of gastric juice is the symptom of flacheries disease.	200	83.33	40	16.67
35	After mounting, the chandrike is kept at a slanting backposition of 45^0C	185	77.08	55	22.92
36	Net is spread over the rearing bed and shoots are fed, picking the matured larvae is called as Jabarai method	105	43.75	135	56.25

F= Frequency %=Percentage

*** Multiple responses**

The above Table 1 inferred that sericulture farmers had medium to high knowledge on recommended technologies of sericulture. The probable reason might be due to fact that sericulture farmers were regularly consulting from officials of grainage centres, TSC extension functionaries, input dealers and peer group about the information on latest sericulture technologies. The sericulture farmers were participating in field days, trainings, study tours, kisan melas etc., under the guidance of TSCs and they were exposed to mass media like television, mobile phone and news paper for the acquisition of knowledge.

The sericulture farmers had high school to middle school education, high scientific orientation, medium experience in sericulture, and medium mass media utilization. This might be the probable reasons for above results. The results were in line with the findings ofReddy (2006) and Kumar (2010).

Conclusion

Scientific knowledge on sericulture technologies among sericulture farmers is inevitable. Majority sericulture farmers did not have knowledge on berseem and green manure crop for supplying additional nitrogen for mulberry cultivation, recommended bio fertilizer for mulberry cultivation, Water discharge rate of drip irrigation in mulberry

cultivation and recommended post emergence weedicide asparaquate. Therefore, TSC officials should impart trainings, demonstrations and disseminate the information on drip irrigation, biofertilizers and weedicides through various mass media and information sources.The strategies must be formulated by The department of sericulture should prioritize the strategies and take into consideration to implement strategies in the form of policy or programmes for betterment of farming community.

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