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To Document the Role and Responsibilities of Extension Workers for Promotion of Sericulture Industry in Jammu and Kashmir (India)

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Authors' contributions

This work was carried out in collaboration among all authors. Author SC designed the study, formulated the questionnaire. Authors SQ and JA carried out the survey and collected literature. Author MAB finalized the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Bivoltine silk produced in Jammu and Kashmir is well recognized on global context but even though having most congenial climatic conditions, the raw silk yield is quite low. The reasons can be attributed to lack of awareness on proper rearing practices among the farmers and adoption rate of improved technologies. Therefore, current study was formulated to document the role and responsibilities of various research and extension institutions for progressive development of silk industry in Jammu and Kashmir (J and K). The survey was conducted in Poonch district of J and K, India during the month of March-April; 2021. The survey was conducted with selected (25) farmers and data were collected using questionnaire. Among 25 respondents, only 08 farmers belonged to middle age group (35 to 50 years) and 72% of them had minimum education level of below 10^{th} standard. 21 farmers had more than 20 years of experience in sericulture and 72% farmers had very less exposure towards extension programmes. Only 15 farmers had attended training programmes and none of them have attended workshops, and farmer exhibition commonly known as kissan melas etc. Thus, the study recommends for strong need for collaboration between the

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farmers and extension professionals for strengthening sericulture. This would help not only to improve the farmers yield realization but also increase their income through sericulture in the long run.

Keywords: Extension; sericulture; yield; role; responsibilities.

1. INTRODUCTION

"India poised to reach the position of second largest silk producer after China, known for producing all the four known commercial silk varieties viz, Mulberry, Tasar, Eri and Muga. In spite of the annual compound growth rate of 4.93% of mulberry raw silk production during the year 2004 to 2015, country still has to import huge quantity of raw silk from the China every year to meet the domestic as well as export demand" [1-3] which represents the actual scenario of productivity demanding progressive development in the field of sericulture and could be realized with the active participation of research and extension institutions.

J and K even though having congenial climatic conditions favourable for silkworm rearing and obtaining higher productivity, but unfortunately the average yield is quiet low because of various factors. Therefore, in order to cope up with these drawbacks, various research and extension institutions working towards the progressive development of sericulture including SKUAST-Jammu, SKUAST-Kashmir, Central Silk Board with its extensions like CSRTI Pampore, Regional Sericulture Research Station Miran sahib (RSRS), Research Extension Centers (REC), sub-units of RECs, State Sericulture Development Department (SSDD) and Department of Sericulture, University of Jammu are actively involved for formulating strategies and their direct implementation by organizing various extension activities. Thus it becomes the responsibility of such institutions to pay attention towards the development of sericulture status in the Union Territory (U.T.) of J and K so as to improve the overall production at national and international level. In this direction state and central sericulture institutions has programmed new initiatives [4]. As part of the extension activity, the division of sericulture of SKUAST-Jammu and SKUAST-Kashmir has adopted different villages for demonstrating package of practices. Thus an attempt was made aiming to document various roles and responsibilities of all institutes and research centres associated with sericulture in Jammu and Kashmir.

2. MATERIALS AND METHODS

The methodology adopted for the present study was framed in the form of pre-designed questionnaire as presented in results section and data on various aspects of sericulture. The main component of questionnaires comprised of information of farmers about exposure to sericulture technologies, experience in sericulture, knowledge about farmer-extension trainings and exposure to mass media etc. (Tables 1-6). The data was collected by personal interview of the selected farmers and subjected Microsoft excel for statistical analysis as presented in results.

3. RESULTS AND DISCUSSION

3.1 General Information of the Farmers

The data on the general information of the farmers and knowledge about sericulture among the respondents of the present survey are described in Table 1 and Table 2. Low literacy rate recorded among the sericulture farmers have been found to pose negative impact on the adoption of latest technologies as earlier reported by Chauhan et al*.,* and Girish et al*.,* [5,6]. In addition to education, experience in sericulture and less participation of family members was recorded to be low in the present survey. As less experience in silkworm rearing recorded among the respondents accounted for low yield and this finding lies in close conformity with the results obtained by Chanotra et al., ; Chauhan et al*.,* ; Shinghivi et al*.,* and Sreenivas et al*.,* [7-9]. The current study also suggested utilizing agricultural land with integration of mulberry plants for improving the productivity status. Similar reports have been made by Fatima; Khan et al*.*, and Kumar et al., [10-12], who also described that area is the basic requirement for any agricultural activity.

3.2 Sericulture Oriented Exposure /Participation in Sericulture Oriented Programmes

The details regarding knowledge of the farmers on sericulture and rearing technology were

recorded to be low as presented in Table 3. The farmers were reported to have less interaction with the experts of State Sericulture Department (SSD) and Central Silk Board (CSB). Additionally, the SSD and CSB organise training sessions, awareness campaigns, and other events to promote sericulture, but sadly, only few farmers were reported to attend these events. They were only reported to have attended training programmes, with relatively few attending the Kissan Mela and field trips, indicating a lack of understanding among farmers about the usefulness of such programmes. Similar results have been also reported by Khan et al*.,* [13], who demonstrated "impact of cluster promotion programme in Bandipora district of Jammu and Kashmir which resulted in the improvement of the socio-economic conditions of farmers and also strengthened the long production chain of sericulture". "The method of acquiring sericulture information had effect on effective training. So extension education programmes have vital roles to play in sericulture" as suggested by Singh et al., and Singh et al., [14,15].

3.3 Support of Government under Various Schemes for Development of Sericulture

Among the surveyed respondents (n=25) maximum farmers had information pertaining to awareness about the support for construction of rearing house but only 72% farmers availed the scheme. Knowledge of the respondents on installment of hot air oven, establishment of reeling unit, incentives on silk yarn and health insurance, Catalytic Development Programme (CDP), schemes of women empowerment and Agricultural Technology Management Agency (ATMA) was negligible as only 20% farmers availed installment of hot air oven and rest of the schemes were recorded with no respondents as they either did not have awareness about these schemes or did not avail benefits out of these schemes as presented in the Table 4. Farmers

Table 1. General Information of the respondents (n= 25)

Sl. No.	Category	Criteria	No. of farmers	Percentage (%)
1. Age (in years)				
a	Young	< 35	04	16
b	Middle	35-50	08	32
c	Old	>50	13	52
2. Education (in standards)				
a	Illiterate	0	06	24
b	Below 10^{th}	1-4	18	72
c	12^{th}	5-10	01	4
3. Family size (No.)				
a	Big	<4	01	4
b	Medium	4-6	21	84
c	Small	>6	03	12
4. Land holding (Area in kanals)				
a	Small	<5	05	20
b	Medium	5-10	19	76
c	Big	>10	1	4
5. Primary occupation				
a	Agriculture	-	25	100
b	Agriculture with Sericulture	-	25	100
c	Service	-	02	08
6. Experience in Agriculture (in years)				
a	Low	<10	0	0
b	Medium	10-20	04	16
c	High	>20	21	84
7. Experience in Sericulture (in years)				
a	Low	<10	08	32
b	Medium	10-20	14	56
c	High	>20	03	12

were recorded to have awareness about various schemes of sericulture and their utilization was asked by the respondents but negligible number of farmers was reported to be associated with them as described in Tables 4 and 5. Earlier, Chanotra et al*.,* [16] suggested significance of the training programmes for improving the crop yield.

3.4 Mass Media Exposure to the Farmers

The majority of farmers were found to be exposed to radio on a regular basis, with 100% of respondents reporting doing so, followed by television with 40% of respondents reporting regular exposure to it and 40% reporting occasional exposure. According to the information provided, none of the respondents had any exposure to agricultural magazines or pamphlets (Table 6). Chanotra et al*.,* and Setty et al*.,* [16,17] emphasized the importance of training programmes and mass media exposure for strengthening sericulture industry in Jammu and Kashmir.

3.5 Role and Responsibilities of Research Institutions for Development of Sericulture

Various research and extension institutes associated with sericulture like SKUAST- Jammu and Kashmir, SSDD, CSB, RSRS and CSR and TI, Pampore were reported to be actively engaged in various research and developmental projects for promotion and extension of sericulture in the state. All the institutions were recorded with the prime role and responsibilities in the field of research including;

Table 2. Information about Sericulture

• **Mulberry Production Practices**			
1.	**Practice mulberry cultivation**		
a.	Yes	16	64
b.	No	09	40
2. System of Cultivation			
A	Irrigated	20	80
B	Rainfed	05	20
3.Methods of irrigation			
A	Channel Irrigation	25	100
4. Having separate Chawki Garden			
A	Yes	0	0
B	No	25	100
5. Fertilizer Input added			
A	Yes	8	32
B	No	17	68
6. Type of mulberry cultivation			
A	Separate mulberry fields	02	8
B	Integrated farming or mix farming	23	98
• **Silkworm Rearing Practices**			
1.Type of rearing house			
a.	Mud type of rearing house	4	16
b.	Concrete or cemented rearing house	0	0
c.	Don't have a separate rearing house	18	72
d.	Separate room in dwelling house	3	12
2.Source of procurement of silkworm seed			
a.	State Sericulture Development Department	25	100
b.	Central Silk Board	0	0
c**.**	Progressive farmers	0	0
3. Name of Silkworm breed			
a.	FC1 FC2	25	100
b.	Any other	0	0
4. Procure Eggs or Chawki worms			
a.	Silkworm Eggs	25	100
b.	Chawki worms	0	0

• **Silkworm Rearing Practices**			
5. Distance from procurement station (kms)			
a.	<15	05	20
b.	15-20	15	60
c.	>20	5	20
6. Commencement of Disinfection			
A	Yes	15	60
B	No	10	40
7. Method of rearing			
A	Tray rearing	21	84
B	Floor rearing	03	12
C	Shelf rearing	01	4
D	Box rearing	0	0
8. Frequency of feeding			
A	Twice a day	2	8
B	Three times per day	20	80
C	Four times per day	3	12
9. Frequency of cleaning			
A	Twice during instar	10	40
B	Once after each moult	15	60
10. Frequency of application of bed disinfectant			
A	Twice during instar	12	48
B	Once after each moult	13	52
11. Types of mountages used			
A	Plastic collapsible mountages	21	84
B	Rotary mountages	0	0
C	Bottle brush mountages	0	0
D	Local mountages material	04	16`
• **Cocoon marketing**			
12. Is there any cocoon market available			
A	Yes	25	100
B	No	0	0
• **Interaction with experts and extension workers**			
13. Interaction with experts			
A	Regular	07	28
B	Occasional	18	72
C	Rarely	0	0
14. Interaction with extension workers			
A	Regular	12	48
B	Occasional	13	52
C	Rarely	0	0

1. Raising mulberry
2. Supply of healthy parental material for making cuttings
3. Breeding of pest and disease resistant varieties
4. Breeding of pest resistant varieties
5. Breeding of varieties with improved quality parameters
6. Formulation of ecofriendly and effective pesticides
7. Fixation of lc-50 and ld-50 values
8. Recommendation of package of practices for mulberry cultivation (pop)
9. Recommendation of package of practices for silkworm rearing (pop)
10. Breeding of superior silkworm hybrids
11. Breeding of pest and disease resistant silkworm hybrids
12. Breeding of pest resistant silkworm hybrids and
13. Breeding of silkworm hybrids with improved qualitative parameters etc.
14. Moreover, Department of Sericulture, Poonch Campus, University of Jammu were recorded to play prime role in education sector for promotion of sericulture among the youth as earlier suggested by Chanotra et al., and Setty et al., [16,17].

3.5.1 Future prospectives

Some of the important roles and responsibilities have been enumerated as below:

1. Commencement of traning and skill development programmes for sharpening and improving the techanical skills of the workers.
2. Conduct technical awareness programmes to enhance knowledge of the workers for operating different types of machines.
3. Development of package of practices for introduction of improved sericulture technologies and its dissemination.
4. Efforts to reduce input cost and drudgery and by-product utilization to increase net income and productivity.
5. Dissemination of knowledge, Research and Development (R and D) innovations and package of practices.
6. Undertake collaborative research programmes/projects with reputed National and International R and D institutions.
7. Strengthening institutional framework to support ongoing research, allied activities, scientific and technical services.
8. Conduct On-station trials (OST) and On-farm trials (OFT) for test verifying the technologies developed by the main research institutes and suggest fine tuning/ modifications of such technologies to provide solutions to region specific problems.
9. Conduct on-farm trials (OFT)/demonstration of the selected technologies with selected farmers in coordination with Department of Sericulture (DOS).
10. Popularize the proven technologies using various extension methods through cluster area approach.
11. Conduct training for both grass root level extension staff of DOS and farmers on advanced technological aspects.
12. Provide assistance in establishment of reeling, weaving, printing and silk dyeing units and financial assistance for acquiring machines.
13. Conduct Transfer of Technology (TOT) trials among the selected farmers.

Table 3. Sericulture oriented exposure /participation in sericulture oriented programmes

S.no.	Category	No. of farmers participated	Duration (Days (days)	No. of programmes attended	Percentage
1.	Trainings	15	15	1-2	60
2.	Workshops	0	0	0	0
3.	Exhibitions	0	0	0	0
4.	Seminars	0	0	0	0
5.	Conferences	0	0	0	0
6.	Kissan mela	8	03	1-2	32
8.	Exposure visits	0	0	0	0
9.	Field days/ Study trips	5	1	1	20

Table 4. Support provided by state sericulture development department in different aspects of sericulture

Sl. No.	Category	No. of farmers			Benefit availed		
		Aware	Unaware	Percentage (%)	Yes	No	Percentage (%)
1	Support for raising mulberry	25	0	100	20	5	80
2	Supply of saplings/ cuttings	25	0	100	25	0	100
3	Supply of rearing appliances	25	0	100	25	0	100
4	Support for construction of rearing house	25	0	100	18	07	72
5	Installment of hot air oven	20	5	20	5	20	20

Sl. No.	Category	No. of farmers			Benefit availed		
		Aware	Unaware	Percentage (%)	Yes	No	Percentage (%)
6	Establishment of reeling unit	20	5	20	0	25	0
7	Incentives on silk yarn	15	10	60	0	25	0
8	Health insurance	15	10	60	0	25	0
9	Catalytic Development Programme (CDP)	10	15	40	0	26	0
10	Schemes of women empowerment	10	15	40	0	25	0
11	Agricultural Technology Management Agency (ATMA)	0	25	0	0	25	0

Table 5. Support provided by central silk board in different aspects of sericulture

Sl. No.	Category	No. of farmers			Benefit availed		
		Aware	Unaware	Percentage (%)	Yes	No	Percentage (%)
1	Support for raising mulberry	25	0	100	10	15	40
2	Supply of saplings/ cuttings	25	0	100	10	15	40
3	Supply of rearing appliances	25	0	100	5	20	20
4	Support for construction of rearing house	0	25	0	0	25	0
5	Installment of hot air oven	0	25	0	0	25	0
6	Establishment of reeling units	0	25	0	0	25	0
7	Incentives on silk yarn	0	25	0	0	25	0
8	Health insurance	0	25	0	0	25	0
9	Schemes for women empowerment	10	15	40	5	20	20
10	Tribal Sub-Plan (TSB)	0	25	0	0	25	0
11	Schedule Caste Sub-Plan (SCSB)	0	25	0	0	25	0
12	Mahatma Gandhi Rural Empowerment Guarantee Act	0	25	0	0	25	0

Table 6. Mass media exposure to the farmers

S. No.	Particular	No. of farmers	Percentage
	• **Exposure to T.V.**		
A	Regular	10	40
B	Occasional	10	40
C	Never	05	20
	• **Radio**		
A	Regular	25	100
B	Occasional	0	0
C	Never	0	0
	• **Newspaper**		
A	Regular	05	20
B	Occasional	05	20
C	Never	15	60
	• **Agriculture based magazine**		
A	Regular	0	0
B	Occasional	0	0
C	Never	25	100

	• **Pamphlets**		
A	Regular	0	0
B	Occasional	0	0
C	Never	25	100
	• **Interaction with scientists of KVK**		
A	Regular	0	0
B	Occasional	10	40
C	Never	15	60
	• **Interaction with Extension Workers**		
A	Regular	0	0
B	Occasional	15	60
C	Never	10	40

4. CONCLUSION

By assisting with sericulture extension, the research provides guidelines for rejuvenating silkworm cocoon production. Effective instruction was the most significant component in revitalising silkworm cocoon production and presenting technology. As a result, extension education programmes play critical roles in sericulture. Various research institutes including SKUAST- Jammu, SKUAST-Kashmir, CSRTI, Pampore, RSRS and CSB etc. were found to be actively engaged in overall development of sericulture by providing trainings on improved technology profits, cultivating mulberry varieties with high yield and appropriate hybrid of seasonal and regional silkworm. State Agricultural Universities i.e. SKUAST-Jammu and SKUAST-Kashmir, University of Jammu and University of Kashmir are reported to participate on national platforms for promotion of sericulture across the UT of Jammu and Kashmir. As a result, it is proposed that extension functionaries take enough care in adopting improved technologies/practices to close such yield gaps at various levels. This would benefit farmers not only by increasing yield realisation, but also by increasing their revenue through sericulture in the long run.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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