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DISSEMINATION OF SERICULTURE TECHNOLOGIES THROUGH IVLP: A STUDY

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Abstract: Sericulture took a rapid stride towards progress emerging as one of the most economically viable, small scale agro based industries. Earlier, the silk production was mainly based on hardy, poor yielding indigenous silkworm varieties which took more time. In spite of the many high yielding silkworm and mulberry varieties / hybrids evolved by research organizations, their dissemination at farmers' level was low. The vigorous research is continuing to improve the productivity and accordingly technologies have also been developed by the scientists for the maximum exploitation of the evolved mulberry and silkworm varieties by the research Institutes of Centre Silk Board and other research organisations but again all the technologies do not reach the ultimate users. An effort was made by Central Silk Board through Institute Village Linked Program (IVLP) to transfer of these technologies to the end users and refine them to suit their system. This study was carried out at Jhabrera area of Haridwar, Uttarakhand and Pilibhit district of Uttar Pradesh. A total of 100 beneficiaries in each IVLP were identified for the study. Material and technological inputs were provided them through extension communication programs. Vigorous supervision studies were made to ascertain the gaps. This may lead to bridge the gap between potential and field yield.
Keywords: Bivoltine; Dissemination; IVLP; Sericulture.
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INTRODUCTION

Silk has a place of pride in the social and cultural lives of Indians, since it is superior to other textile fibres in qualities like durability, texure and low weight. Hence, it is regarded as the Queen of textiles. According to historians, raw silk was exported from India to Rome during the reign of Kanishka in 58 B.C. Sericulture has a special place among the agro-based cottage industry of our country. India is the largest natural silk consumer in the world, though, it is second silk producing country after China. The demand of the silk is consistently increasing in the country over the years. As a result, the demand – supply/production gap is widening specially in mulberry raw silk. This has resulted in import of silk from China to meet the demand of the Indian silk industry. Hence, it has been felt by the policy makers to improve the productivity and quality of Indian silk to meet the import substitute for domestic market and to compete in the International market in changing scenario of Global trade. Keeping in consideration, Government of India initiated various programs to promote sericulture in the country, following which sericulture took a rapid stride towards progress emerging as one of the most economically viable small scale agro based industries.

Sericulture plays an important role in employment generation for rural population of the country. After independence, sericulture development took place rapidly and several technologies were evolved for improving the quality and quantity of Indian silk by improving the adoption behaviour of the silkworm rearers. In the recent years, continuous and vigorous research is being carried out by Central Silk Board, Govt. of India and other research organisations of the

country to evolve high yielding mulberry and silkworm varieties suitable for tropical as well as sub-tropical climatic conditions of the country. Many of the high yielding varieties are already in the field (Mohan *et al.,* 2007; Juyal *et al,* 2007; Dandin and Giridhar, 2014). Technologies are also developed, accordingly, for the maximum exploitation of the evolved breeds / races. Many extension approaches have also been followed in the transfer of sericutlural technologies to the farmers from time to time (Singh *et al,* 2007; Babulal *et al,* 2007). But, most of the technologies do not percolate to the actual beneficiaries. It has been observed that silkworm rearers hesitate to adopt the developed technologies as technologies were developed without taking into consideration the socio-economic and psychological status of the beneficiaries. It is felt that developed technologies need to be assessed and refined as per the requirement of the silkworm rearers in different agro-climatic and socio-economic conditions to harness the benefit of research in improving the quality and quantity of the silk in the country. With this approach, an intermediary function of technology assessment and refinement was initiated for technology integration through farmer participatory methods for rapid dissemination of appropriate technology. Beneficiaries' oriented research and technology development to improve the quality, increase the quantity and sustainability are the basics. It has given new dimension to extension strategies. The stakeholders are also partner in the technology development and assessment process (Anonymous, 2004). With this objective, the idea of Institute Village Linkage Program had come in which participatory approach of scientist, extension staff of CSB, DOS and respective target groups were taken in to consideration. In this paper, efforts have been made to bridge the gap between research and field *i.e.,* potential and production at Haridwar and Pilibhit districts of Uttarakhand and Uttar Pradesh respectively through IVLP approach.

EXPERIMENTAL

Regional Sericultural Research Station, Sahaspur has implemented Institute Village Linkage Program (IVLP) in two states viz. Uttarakhand and Uttar Pradesh. The districts selected for this program were Haridwar in Uttarakhand and Pilibhit in Uttar Pradesh. 100 beneficiaries in each IVLP have been identified. Plantation of improve mulberry variety (S-146) was taken up with 100 plants with each beneficiaries during monsoon of 2015.

Material Inputs: Following material inputs were provided to the identified beneficiaries under Institute Village Linkage Program (IVLP):

i. 10.000 saplings in per IVLP were supplied @ 100 saplings per beneficiary.
ii. Bed disinfectants were supplied in both IVLP for all selected beneficiaries for silkworm rearing in both spring and autumn crop.
iii. Plastic rearing trays @ 30 per beneficiary in both IVLP.
iv. Plastic collapsible mountages @ 40 per beneficiary in both IVLP.
v. Literature related to mulberry cultivation and silkworm rearing.

Technological Inputs: The technological inputs (Technologies for Silkworm rearing and Mulberry Cultivation) for IVLP program of Uttar Pradesh and Uttarakhand was provided directly by RSRS, Sahaspur, Dehradun through respective REC's functioning in the district. Technologies are as detailed below:

i. Introduction of high yielding mulberry varieties.
ii. Integrated nutrient and pest/disease management of host plant.
iii. Pruning / leaf harvesting techniques.
iv. Leaf transportation and preservation techniques.
v. Introduction of high yielding silkworm hybrids.
vi. Late age rearing technologies.
vii. Silkworm disease management.
viii. Use of Plastic mountages.
ix. Cocoon harvesting/sorting and drying techniques.

Silkworm Rearing: Silkworm seed of CSR hybrids procured from NSSO, Bangalore through DOS, U.K., Dehradun and DoS, UP, Pilibhit was Chawki reared and distributed among the IVLP farmers. Silkworm rearing was conducted as per the recommended package of practices (Dandin and Giridhar, 2014; Jolly, 1987). Ripen worms were mounted in plastic mountages for cocooning and were harvested on 7th day of mounting.

Weightment of cocoon was recorded for quality assessment.

RESULTS AND DISCUSSIONS

Silkworm rearing was mainly conducted in rearing cum dwelling houses. Generally, floor rearing was being taken up by the farmers in the study areas and mounting of the larvae on easily available materials were taken up. This leads to low production and poor quality of cocoon resulting in low income from sericulture activity. In view of the above, IVLP had been initiated to strengthen the silkworm rearers. In order to improve the productivity and quality of their produce, rearing plastic trays and plastic collapsible mountages were provided/ supplied to the beneficiaries. Silkworm rearing has been conducted during spring and autumn seasons in both the IVLPs. The progress of silkworm rearing conducted under IVLP is depicted in the table 1. It is apparent from the study that overall productivity and quality of the cocoon improved.

The cocoon productivity during spring season was plus 50 kg/100 DFLs and 45. Kg/100 DFLs in Pilibhit and Haridwar district of Uttar Pradesh and Uttarakhand states respectively. Similarly, during autumn season it was plus 50 kg/100 DFLs and 33 kg/100DFLs for Pilibhit and Haridwar respectively. The difference in productivity may be due to the climatic conditions in the area as Pilibhit falls under tarai area of Uttar Pradesh. Findings of the present study clearly indicate that average cocoon production (kg/100 DFLs) in both the seasons viz., autumn and spring have reached to stagnation level under Haridwar and Pilibhit IVLPs (Table 1) even though it is higher the average cocoon production of the state. It is felt that fine refinement of the silkworm technologies as per the need of the beneficiaries may improve the cocoon productivity, specially, during autumn season in Haridwar, Uttarakhand which remain stagnant around 33 kg/100 DFLs.

Table 1. Silkworm Rearing Performance

#	Name of the IVLP Centre	Year	Season	Chawki worms Supplied (Nos.)	Cocoon harvested (kg.)	Average yield (kg. / 100 DFLs)	Raw Silk Production (MT)
1.	Pilibhit, UP	2016	Spring	1000	551.0	55.10	0.73
			Autumn	5000	2600.0	52.00	3.06
		2017	Spring	5000	2739.0	54.78	3.65
			Autumn	5000	2850.0	57.00	3.35
		2018	Spring	5000	2150.00	43.00	2.8.7
			Autumn	5000	2700.00	54.00	3.18
2.	Jhabrera, Haridwar, UK	2016	Spring	1000	452.0	45.20	0.60
			Autumn	1600	533.3	33.31	0.62
		2017	Spring	5000	2501.0	50.10	3.33
			Autumn	5000	1650.0	33.00	1.94
		2018	Spring	5000	2290.00	45.80	3.05
			Autumn	5000	1650.00	33.00	1.94

Table 2. Extension Communication Programs

#	Name of IVLP	Particulars				
		Group Discussions (No./Farmers)	Field day (No./ Farmers)	Farmers day (No./ Farmers)	Film Shows (No. /Farmers)	Awareness Programs (No. /Farmers)
1	Haridwar, UK	04/98	01/51	03/96	01/21	01/91
2	Pilibhit, UP	04/90	01/103	03/64	01/22	01/107

Extension Communication Programs

Farmer's participatory Extension Communication Programs (ECP) were also being taken up by both IVLPs for effective diffusion and adoption of improved sericultural technologies at field level. The details are given in table 2.

During extension communication programs, farmers were educated; motivated on the basic aspect of package of practices for quality mulberry leaf production and appropriate silkworm rearing approaches (Dandin *et al.,* 2003; Chakrabarti *et al.,* 2005). The importance of hygiene in rearing house, leaf quality maintenance (Shankar *et*

*al.,*1992) during preservation and also rearing bed, spinning larvae and cocoon harvest management were also disseminated to farmers (Maniraju *et al.,* 2000; Haroon *et al.,*2018). This has ultimately affected on cocoon productivity. This indicates that adoption of technologies plays an important role. This is in conformity with the findings of Aslam *et al.,* (2007). However, the actual productivity depends on the acceptance and the extent to which farmers adopt recommended technologies (Jaishankar and Dandin, 2004). Verma *et al.,* (2007) reported that cocoon yield could be improved if the technologies are transferred meticulously and adopted by the farmers sincerely. This indicates that like other avocations, sericulture activity may be more remunerative and economically viable in the areas taken into consideration for the study.

It is reported that the optimum temperature for the production of quality cocoons is ranges from 22-28°C (Datta, 1992; Krishanswami *et al.,* 1993). Similarly, the optimum humidity ranges from 70-85% for successful silkworm rearing resulting in quality cocoons production. The day to day, season to season and year to year variations in the environmental conditions within the same season also effect on the productivity and it emphasize the need of temperature and relative humidity for sustainable cocoon production as observed in the present study is in accordance with the earlier findings (Rahmatullah, 2012). In general, the early instar larvae are resistant to high temperature which also help in improving survival rate and cocoon characters (Thiagarajan *et al.,* 1993; Ramesh *et al.,* 2009). The raw silk production during the year 2018 has decreased from the previous year *i.e.* 2017 due to the unfavourable climatic condition prevail during spring rearing season of 2017 (Figure 1).

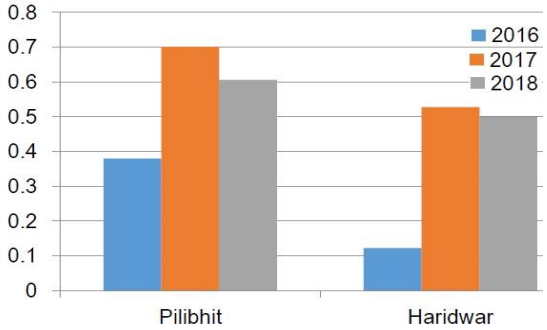

Figure 1. Raw Silk Production in Different Years

The seasonal differences in the environmental components such as temperature, relative humidity, light and nutrition considerably affect the genotypic expression in the form of phenotypic output of the silkworm crop such as cocoon weight, shell weight and ultimately cocoon shell ratio (Rahmatullah, 2012). Further, the spring season is congenial for silkworm rearing throughout the Northwest India as the optimum temperature and humidity prevails in the environment during rearing period whereas autumn season is unfavourable due to high temperature and high humidity prevailing in the environment. That's why spring crop is better than autumn crop as observed in the present study. Impact of Institute village linked programs were also studied in Karnataka (Hiriyana *et al.,* 2008), Tamil Nadu (Krishnamoorthy *et al.,* 2008) and West Bengal (Bagchi *et al.,* 2008). This approach has been proved successful in bringing the scientists and stakeholders on single platform developing specific remedies to the problems, fine tuning of the existing technologies and/or development of new need based technology suitable for the stakeholders.

CONCLUSION

In IVLP approach, effective R-E-F linkage is maintained and the technology spread is eminent for farmers. It can be safely concluded from the present study that farmer's participatory extension communication programs, its effective diffusion among farmers and adoption of improved sericultural technologies at field level has improved cocoon productivity resulting in improving farmer's income. IVLP approach also help in developing mulberry wealth and rearing facilities to the rearers for continuing sericulture in coming years. This indicates that like other avocations, sericulture activity may also help to uplift the weaker section of the society in these areas. Therefore, it is concluded that this IVLP program has a positive impact on adoption of improved technologies by farmers and improvement in their knowledge level. Through this they can earn for their better livelihood and better look after their families by increasing their annual income through bivoltine double hybrid silkworm rearing.

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