



# **A study on transfer of technology at field level in Murshidabad district of West Bengal in terms of Silkworm rearing**

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## **Abstract**

Present study clearly indicates that Only 5 % small farmers and 18 % big farmers care about the recommended worm spacing. Only 3 % small farmers and 30 % big farmers adopt the measures of bed cleaning during silkworm rearing. Only 20 % small farmers and 30 % big farmers know about type of leaf fed at different instar. Only 23 % small farmers and 35 % big farmers know about the recommended control measures for disease. The above shortcomings in knowledge and adoption level of sericulture farmers would serve as pointers for designing education strategies of sericulture field workers. First, sericulture educators must accept small and marginal farmers who are considered as disadvantaged section of the society as their target groups to update their technical know-how and motivate them to adopt improved sericulture practices. Second, these studies suggest the need for intensification of educational efforts by sericulture field functionaries in the backward areas of sericulture. In contrast to this, less attention has to be given to areas where farmers have already mastered the management practices of sericulture. Third, sericulture extension workers, instead of recommending all package of sericulture practices to the farmers, have to concentrate and emphasize such practices which are not known and adopted by farmer. Such practices include types of leaves to be fed, number of times of feeding, adoption of proper disinfection procedure.

**Keywords:** Sericulture, Adoption, Murshidabad District

## Introduction

Sericulture is unique in its vast employment and income generating potentialities. From a mere traditional practice, it has now shaped into a viable agro industry. India contributes about 20% to the raw silk produced in the world, ranking next only to china. India is now technologically more equipped than ever before to attempt for a quantum jump. According to John Ruskin, "Quality is never an accident; it is always a result of high intentions, sincere efforts, intelligent directions and skillful executions". Production of quality silk is also not an exception.

Sericulture in India is an important agro-based cottage industry providing employment to millions in the villages and earning foreign exchange to the tune of 2000 crores of Rupees per year. Indian sericulture is largely dependent on mulberry silk production by the silkworm *Bombyx mori* L.

Transfer of improved sericulture technology to farming community is as important as invention or development of technology itself. Effective transfer of technology is a prerequisite to realize the full potentialities of technologies at users level (Rama Mohana *et al*). The transfer to the farming population is a basic requirement to bring about changes in income and employment levels of sericulture farmers, which will lead to rural development through augmented knowledge and skills of this population. In this perspective it can be argued that rural development means "transforming unskilled man/labour into skilled man/labour." (Rame Gowda and Venkataranga Naika, 1988). Kohli (1981) viewed rural development as an approach aiming at the total development of an area and its people by bringing about necessary institutional and attitudinal changes and by delivering a package of services through a process of planning and a battery of extension methods. Thus, rural development is a complex phenomenon involving several factors such as economic factors, availability of information and inputs, farmers' knowledge about enterprise, constraints in the application of technology etc. Development does not depend

alone on soil, water, availability of technology etc. Parallel to these physical factors, human factors which are equally important are farmers knowledge, attitude, motivation and perceived attributes of technology.

The knowledge of sericulture basically silkworm rearing is a pre-requisite for adoption of technology results in increased income and employment. High profit is the ultimate aim of farmers to take up any cash crop. In sericulture, this can be achieved by providing as many cocoons as possible of good quality from a unit of silkworm seed or mulberry area. Among the various factors contributing to the degree of success of crop and the extent of profit, silkworm rearing is important. Because silkworm *Bombyx mori* L is a delicate and domestic insect (Fukuda 1959). Any fluctuation in temperature and humidity and improper maintenance of hygienic condition during silkworm rearing may result in improper growth of silkworm larvae which ultimately results in poor harvest of cocoon crop. Matsumara *et al.* (1958) reported that out of the various characters responsible for success of cocoon crop mulberry leaf stood first (38.2%) followed by climate (37%), rearing techniques (9.30%), silkworm race (4.02%), Silkworm eggs (3.10%) and other factors (9.60%) etc. Proper Silkworm rearing techniques also helps to maintain climatic factors in the rearing room (Rajan & Himantharaj, 2005).

It is clear from the above that silkworm rearing is one of the major important factors for successful harvest of cocoon crop. Proper silkworm rearing also helps to rear comparatively more productive breeds even in unfavourable season (Sarkar, 2008).

Though various new practices including construction of cost effective rearing houses, low cost rearing appliances are developed by various research institutes in recent times but it is important that technologies should penetrated or disseminated at farmers level. Because farmers are the ultimate users of the technologies. If newly innovated technologies do not reach at farmers level, there will be no utilities of

innovation of new technologies. So present study has under taken to know the adoption of silkworm rearing practices at farmers level in different traditional districts.

Besides that, knowledge of sericulture enterprise is the essential element in the process of rural development.

At knowledge stage, farmers are exposed to the existence of improved sericulture technology. Once the farmers are exposed to the technology, depending on their needs, they evaluate the technology by considering its attributes such as economic profit, cost, and complexity involved in its application, its physical compatibility with their previous farming experience etc. If the farmers are satisfied with the intrinsic and extrinsic attributes of a sericulture technology, they test the new technology on recommendation on a limited scale (e.g. application of bed disinfectants in the rearing bed). When trials give encouraging results, farmers may accept the large scale application of technology and if the results are discouraging farmers may reject the technology.

There is a long tradition of Sericulture in West Bengal and as well as in Murshidabad District. Sericulture has a very old tradition in Murshidabad District. It is the 2<sup>nd</sup> largest silk producing districts of West Bengal (Giridhar and Ramesha 1999 & 2003, Sarkar, K,2009). Chronological sequence of various stages of growth of sericulture is difficult to ascertain due to lack of systematic record in this District. Murshidabad silk came to prominence during Muslim regime in the 13th century. Organized development of sericulture & proper exploitation of silk in this District is initiated by East India Company. East India Company started exporting Bengal Silk to Europe from Murshidabad. Murshidabad is the pioneer of some unique handy craft like Murshidabad Silk, Baluchari etc. (Chattopadhyay and Sarkar, 2006, 2008).

Hence, in the above context it is worthwhile to conduct research studies in Murshidabad District of West Bengal to know farmers knowledge has

to be enhanced or not and also, understanding of silkworm rearing practices which are presently not adopted by farmers would enable field extension workers to develop appropriate educational approaches to upgrade their adoption level for increasing the cocoon yields, thus aiding in generation of higher income and employment amount the rural mass.

## **Materials and Methods**

By adopting purposefully random sampling, sample of 200 respondents, 100 each from small farmers (land holding capacity 1 acre or less than 1acre) and big farmers (land holding capacity more than 1 acre) of Nabagram Block of Murshidabad District were selected. To know the farmers knowledge about silkworm rearing practices the respondents were interviewed to elicit information in various aspects of cultivation. Data pertaining to the related topic was collected after three visits in November, 2013, February, 2014 and April, 2014 crop by personally interviewing with the aid of design questionnaire (Ray, G.L. & Mandal, S.1997) and interpreted. Sericultural farmers are categorized based on their knowledge as Low, Medium and High as following ways.

**Low:** Farmers are illiterate, not expose to any formal sericultural training and completely unaware about latest innovations/technologies.

**Medium:** Farmers are literate, aware about latest innovations but reluctant to apply latest innovations in the field.

**High:** Farmers are literate and of innovative nature and apply latest technologies in their field.

### **Target Group**

Sericultural farmers who are actively engaged traditionally in sericulture are considered as target group in both the traditional district.

**Table 1. Farmers knowledge about silkworm management practices**

Sl no.	Recommended practices	Average Knowledge level small farmers (N=100)		Average Knowledge level big farmers (N=100)	
		Number	Percentage	Number	Percentage
1.	Source of disease free laying	100	100	100	100
2.	Race of silkworm	80	80	90	90
3.	Chawki rearing centre	10	10	20	20
4.	Recommended worm spacing	5	5	18	18
5	Number of feeds	35	35	63	63
6	Time of feeding	35	35	62	62
7	Type of leaf fed at different instars	20	20	30	30
8	Leaves preservation measures	5	5	43	43
9	Number of bed cleanings	3	3	30	30
10	Temperature manipulating measures	3	3	17	17
11	Recommended control measures for disease	23	23	35	35

Source: data collected during survey in Nabagram Block of Murshidabad.

**Table 2. Categorization of sericulturists based on their knowledge on sericulture enterprise**

Sl no.	Category	Knowledge Men (N=100)		Knowledge Women (N=100)	
		Number	Percentage	Number	Percentage
1.	Low	33	33	63	63
2.	Medium	50	50	27	27
3.	High	17	17	10	10

## Results and Discussion

### Knowledge level of sericulture farmers about silkworm management practices

It is evident from Table 1 that majority of the small and big farmers had knowledge about the source of disease-free laying and race of silkworm. As opposed to this trend, very less number of big and small farmers were aware of the recommended spacing for worms, number of

feeds, types of leaves to be fed, leaves preservation measures, number of bed cleanings, temperature manipulating measures and control measures for diseases. Only 5 % small farmers and 18 % big farmers care about the recommended worm spacing.

Only 3 % small farmers and 30 % big farmers adopt the measures of bed cleaning during silkworm rearing. Only 20 % small farmers and 30 % big farmers know about type of leaf fed at

different instar. This observation supports the view of Chattopadhyay *et al* (2004) who have suggested that only 15% of small farmers and 30% of big farmers of Mothabari in Malda District, 4% of small farmers and 64% of marginal farmers in Panchgram of Murshidabad District and 16% of big farmers, 8% of small farmers and 8% of marginal farmers of Nalhati Block of Birbhum District know about the proper types of leaves fed to silkworm. Only 23 % small farmers and 35 % big farmers know about the recommended control measures for disease. Present study reveals that most of the farmers are reluctant to use bed disinfectants during silkworm rearing even when Government provides it free of cost. It is important to maintain proper temperature during silk worm rearing for proper harvesting of cocoon crop (Krishnaswami, 1978). But only 3 % small farmers and 17 % big farmers adopt proper measures for proper manipulating of temperature in side the rearing room during silkworm rearing. For the stabilization of cocoon crop role of chawki rearing centre is important (Prabhakar, 1983). But there is no provision of chawki rearing centre in the selected areas. Only 10 % of small farmers and 20 % of big farmers have heard it only.

As it could be observed, there is a considerable knowledge and adoption gap among sericulture farmers. Bridging this gap is the concern of all engaged in the task of transfer of sericulture technology. In this context designing an effective communication strategy to reach sericulturists is very much required.

Sericulture is practiced in West Bengal since centuries and it is an age old industry in West Bengal. It is the major traditional state of mulberry silk production in India. At present mulberry is cultivated in 33560 acre land and 107000 families are engaged in mulberry sericulture. Estimated mulberry raw silk production during 2004-2005 was 1520 MT (10.39% of total mulberry raw silk production in India). But still a heavy decline in Sericulture is seen in West Bengal. In 1997-1998 mulberry was cultivated in 53,395 acre (21358 ha) of land but it is now reduced to merely 33560 acre of land

(Chattopadhyay and Sarkar, 2004, Giridhar and Ramesha 1999 & 2003). There is lot of factors behind that downfall of sericulture in the state.

It is true that it is not easier to rear productive bivoltine races or even crossbreeds during unfavourable season (May to part of October) because crossbreeds with bivoltine components cannot with stand high temperature and greater humidity ( Das *et al.*, 1994, 2006). So rearing of high yielding races in our State is not in the reach of farmers. But our farmers even do better by using traditional multivoltine hybrid (N×M12 (W) and cross breed N×NB4D2) if they follow proper practices during silkworm rearing.

### **Categorization of sericulturists based on their knowledge on sericulture enterprise**

An examination of Table 2 highlights that the majority of the sericulturists, both men and women, had low to medium knowledge with respect to improved sericultural practices. The investigation revealed that 50% of farm men were aware of only 50 percent of the recommended sericulture practices. But only 27% farm women were aware of only 50 percent of the recommended sericulture practices. Field investigation by Prakash Kumar (1986) showed that farm women contribute about 50 to 60 percent of labour for mulberry cultivation and silkworm rearing respectively. Therefore, there is a need to equip farm women with adequate knowledge and skills of improved sericulture practices. On the other hand Patel (1985) conducted a study in Bangalore, Karnataka and informed that 75 % farm men and 65 % farm women were having medium knowledge with respect to improved Sericultural Practices. It is quite evident from the results that lack of dissemination of technology at farmers' level is one of the major reasons behind the downfall of sericulture in West Bengal (Sarkar, A, 2006).

Worm spacing and control measures of pest and diseases which have bearing on cocoon yields.

Fourth, Field investigation by Prakash Kumar (1986) showed that farm women contribute about

50 to 60 percent of labour for mulberry cultivation and silkworm rearing respectively. Therefore, there is a need to equip farm women with adequate knowledge and skills of improved sericulture practices (Suryanarayan, N. 1988, Nomani. M.K.R, 1988, Bongale *et al* 1991, Nagrajan and Radha, 1990, Datta, R.K.1992).

As it could be observed, there is a considerable knowledge and adoption gap among sericulture farmers. Bridging this gap is the concern of all engaged in the task of transfer of sericulture technology. In this context designing an effective communication strategy to reach sericulturists is very much required.

### **Communication Strategies to reach sericulture farmers**

A wide variety of extension methods, teaching aids and mass media are at the disposal of change agents (extension workers) engaged in sericulture development efforts to bring about desired changes in knowledge, attitude and skills of the farmers. While deciding upon the communication strategies the principle of adult learning such as individual differences among farmers, the principle of practices, repetition, reinforcement and rewards need to be taken into consideration.

The farmers can be reached through individual contact methods such as farm and home visits, mailed letters, office calls etc. Certainly, these are very effective methods. However, it is very time consuming and relatively expensive too. The group contact methods that could be effectively used are the demonstrations, group meetings with slides or specimens and the farmers training. Various social scientists have clearly brought out that group contact methods such as training and demonstration have considerable influence on knowledge and impact on the behaviour of farmers. The mass contact methods which could be economically used to educate farmers located at vast geographical areas are Radio, Motion pictures, Newspapers, Sericulture magazines and leaflets and Television. The recent technique of combination of media or multiple channel approach could also be taken advantage of in communication process. However, it is very

important to use these methods in a scientific manner with an understanding of the different principles, stages and steps involved in each method to create a meaningful structured non formal learning situations for farmers.

The study conducted by Prabhakar (1983) in four villages of Chikkaballapur Taluk, Karnataka State, revealed that chawki rearing centres, friends and progressive farmers are the most consulted sources of information by sericulture farmers. Chawki rearing centres are managed by sericulture demonstrator, who is technically competent and more accessible to farmers. In view of this, it is necessary to maintain "Sericulture information corner" at each chawki rearing centre. This information corner should provide information about recent advances in sericulture and also suitable solutions to farmers' field problems. Also, in these centres, literature on sericulture should be made available to farmers in the form of leaflets, booklets etc. But here concept of chawki rearing centre is almost nill. Organising group discussion meeting of farmers and method demonstration in the chawki rearing centres by sericulture demonstrator will benefit farmers to acquire the required knowledge and skills.

Secondly, progressive farmers and friends are serving as important sources of information. A significant inference that could be drawn from this fact is that the progressive able asset to sericulture field functionaries in their onerous task of convincing farmers about new sericulture ideas. Much attention needs to be paid to locate, train and use these farmers. In view of the practical impossibility of reaching all farmers by sericulture field workers, the transfer of technology through progressive farmers and local influential farmers is inevitable. The other added advantage is, system their words carry high weightage in the society. Therefore, they can easily convince their fellow farmers to accept the sericulture innovations.

In the light of foregoing discussion, it could be concluded that imparting sericulture knowledge to farmers is the pre-requisite to change their

attitude, skills and adoption level, which are the essential components of Rural development. The differential knowledge and adoption among sericulturists has to be taken note of by sericulture field workers. The knowledge and adoption gaps among sericulturists have to be bridged by re-orienting communication strategies and tailoring their educational efforts to suit different categories or sericulture farmers. The use of information sources such as chawki rearing centres, progressive farmers, local influentials and the suitable extension methods by sericulture extension workers to transfer effectively the technical know-how to the farmers is a worthy proposition.

Thus equipping the sericulture farmers with scientific knowledge, favourable attitude, required skills and motivation to adopt recommended sericulture technology is the foundation on which Rural development can be initiated in a planned manner. Besides this, development should be more an integrated, interagency responsibility than the responsibility by a few Government departments. A continuous and fruitful sericultural research, supported by strong extension service coupled with a policy support can metamorphose the sericulture development.

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