

GOVERNMENT OF INDIA
NATIONAL COMMISSION ON AGRICULTURE

INTERIM REPORT
ON
SERICULTURE



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SUMMARY OF RECOMMENDATIONS

1. The economics of silk production depends largely on the following three factors:-
 - (a) Conversion factor of mulberry leaves to silk cocoons - the weight parities;
 - (b) quality of filament and its length in the cocoon; and
 - (c) the rendita - the proportion by weight of reeled raw silk in a cocoon.

The Central Sericultural Research and Training Institute, Mysore has done important work in this direction, but still much more work needs to be done. Similarly, further supporting work is necessary in other important silk producing States like West Bengal, Uttar Pradesh and Jammu & Kashmir. A suitable plan of action has been suggested in the following paragraphs which should be taken up in the major silk producing States for modernising the sericulture industry.

(Paragraphs 5.2 and 5.3)

MYSORE

2. The Central Sericultural Research and Training Institute, Mysore has evolved a method of rearing bivoltine hybrids in various seasons of the year. Where mulberry is grown under irrigated conditions, the returns per unit of area are very high. It is, therefore, necessary to draw up a phased programme of introduction of the bivoltine hybrids in the

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irrigated mulberry areas of Mysore, particularly Kolar and Chennapatna. These areas should be saturated with this programme during the Fifth Plan period. Also, suitable grainages should be located for the preparation of the layings for supply to these areas. During the time lag when the grainages are established and when they reach their capacity, it would be necessary to seek for the import of seed material so as to keep up the production of cocoons to the planned level.

(Paragraph 5.4)

3. The Central Institute should be enabled to produce the nucleus seed and multiply the same in further stages at the State seed research and multiplication stations. As new strains will be continuously evolved, it is desirable that strong extension units are added to the State organisation in particular and also to the Central Institute. Also, the extension organisation at the Central Institute must comprise of the experts from various disciplines involved in the new programme and should be additional to the present strength of staff. These experts should be involved in the research as well so that they can transfer the ideas properly to the farmers.

(Paragraph 5.5)

4. The Central Institute has evolved the package of practices for new methods of leaf chopping and modified trays for the first two moults and the larger area for the

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subsequent moults whereby less mortality of the silk-worms and a higher cocoon to leaf ratio have been achieved. A phased programme should be drawn up by the Government of Mysore to cover the entire sericulture area with the new practice during the Fifth Plan period. Suitable extension and training organisation should be built up to ensure this. The extension organisation of the Central Institute should also supervise this programme in the field to guide the State extension workers and to take part in the training programme for extension workers.

(Paragraph 5.6)

5. In the villages where there are large groups of rearers, cooperative chawkie rearing-cum-reeling units should be organised during the Fifth Plan period. For this purpose the managerial subsidy given in the cooperative system should be forthcoming for these ventures. Such units would also facilitate expert supervision by the extension organisations of both the State Government and the Central Institute.

(Paragraph 5.7)

6. In unirrigated areas bulk of the rearing would be with the local Mysore race. This race is being improved and already three strains, viz., Hosa Mysore-I, Hosa Mysore-II and Hosa Mysore-III have been released for field use. More research effort

is required in the matter of cross-breeding the local and exotic strains.

(Paragraph 5.8)

7. and
Testing/improvement of the high quality bivoltine exotics have to be a continuing process. It is desirable that the newer and better strains should be introduced all over the State in a phased manner during the Fifth Plan period. For this purpose provision of grainages and stations for the multiplication of the foundation stock would have to be increased.

(Paragraph 5.8)

8. Since sericulture gives the best return on the irrigated land, a subsidised programme of digging open wells for mulberry plantations by the small and marginal farmers in the silkworm rearing areas where ground water is reasonably assured, would be desirable as a measure of social justice. The small and marginal farmers may be given 25 per cent Central subsidy on digging of wells under the sericulture development programme to be financed by the Central Silk Board.

(Paragraph 5.9)

WEST BENGAL

9. The Central Research Station, Berhampore is reported to have already developed many good heat resistant strains suitable to local conditions. A crash programme should be taken up to test the suitability of

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these strains before steps are taken to introduce them on a wide scale in the State through a phased extension programme as is suggested for Mysore. Also, a programme to introduce suitable bivoltine hybrids on a large scale should be undertaken.

(Paragraph 5.11)

10. The districts of Bankura, Purulia and Birbhum seem to have favourable humidity and temperature conditions for silkworm rearing. Also, in Bankura and Birbhum there are Kangsabati and Mayurakshi irrigation projects which can support the raising of mulberry under irrigated conditions. Pilot field stations of the Berhampore Central Research Station should be set up immediately in these districts to establish the suitability of mulberry cultivation under irrigated conditions and explore the possibility of introduction of bivoltine hybrids.

(Paragraph 5.12)

11. The Berhampore Central Research Station with its proposed field stations in the three districts mentioned above should take up a comprehensive applied research programme on the lines of the Central Institute, Mysore to select the strains suitable for the local conditions and to continuously improve them. This programme should be sanctioned by the Central Silk Board and ^{the} Ministry of Industrial Development on a priority basis.

(Paragraph 5.13)

JAMMU AND KASHMIR

12. Jammu and Kashmir is concentrating on univoltine races which give only one brood per year. Research will have to be undertaken to identify races or strains which can be introduced in this State so that three broods can be raised in a year. The spring is long enough in Jammu and Kashmir and it is slightly lower temperature that has to be handled during this season. It would be useful to conduct experiments with various races from Japan to select suitable bivoltines which yield the desired quality as also the three broods in a year. The Central Silkworm Seed Station, Pampore and the Univoltine Research Cell at Majra should tackle this problem on a priority basis.

(Paragraph 5.15)

13. The introduction of a three brood programme in the State has to be supported by a bush mulberry programme. Suitable areas in the Karewas in Kashmir Valley as also in Jammu should be identified for raising bush mulberry. A survey of these areas should be carried out quickly.

(Paragraph 5.16)

UTTAR PRADESH

14. Considering that it is possible to cultivate mulberry under irrigated conditions, it is desirable to introduce the bush mulberry provided the number of crops per year can be raised to three against two at present. This would involve immediate steps relating to (a) carryir

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out of applied research; (b) trying and developing bivoltine hybrids suited to the area; and (c) organising a research station for the area to carry out the work expeditiously.

(Paragraph 5.17)

GENERAL

15. The programme of intensive sericulture backed by irrigation requires credit support for the farmer and cocoon rearer. The entire process starting from the raising of mulberry to the disposal of the raw silk has to be taken on an integrated basis for the purposes of credit support and for developing an economically viable programme of sericulture. Functional cooperatives should be organised for this purpose. They should get their finance from a single source for the entire chain of operations, and this may be authorised by the Agricultural Credit Wing of the Reserve Bank of India. Also, sericulture can be included as one of the items in the list of activities of the Farmers' Service Society and the functional district organisation which has already been recommended by the Commission in its Interim Report on Credit Services for Small and Marginal Farmers and Agricultural Labourers.

(Paragraph 5.18)

16. Research and extension organisations should work in close coordination for introducing modern

equipment and methods of drying so as to prevent the emergence of the moth and the spoiling of the cocoon.

(Paragraph 5.19)

17. There are wide fluctuations in the cocoon and raw silk prices which affect the stability and progress of sericulture industry in the country. This stresses the need to ensure a fair price to the primary producer as also to ensure supply of raw silk to the consumer at a stable price. A suitable Government policy on this subject will have to be evolved. A recommendation has been made in the Report of the Price Stabilisation Committee constituted by the Central Silk Board (December, 1972) that a Raw Material Bank should be established at the Central level with the State level organisations in different silk producing States. Early steps should be taken by the Central Silk Board to implement this recommendation.

(Paragraphs 5.20 and 5.21)

18. In order to link up the prices of raw silk with quality, operation of price stabilisation system would necessitate the establishment of a chain of testing houses at least in the more important silk centres.

(Paragraph 5.21)

19. All the silk producing States should undertake a quick sample survey through their Statistical Bureau* for collecting estimates regarding the number of persons

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employed and families engaged in sericulture on a full time and part time basis.

(Paragraph 5.22)

20. State Governments should take necessary steps for undertaking the programme of sericulture in the potential districts indicated in Appendix II on the lines suggested in Section V of the Report.

(Paragraph 5.23)



INTERIM REPORT ON SERICULTURE

SECTION I

INTRODUCTION

1.1 Silk is a fibre which can be put to a variety of uses in apparel, drapery, hosiery and upholstery industries. India ranks fifth among the silk producing countries in the world, accounting for a little over 5 per cent of the total world production. India has the distinction of having all the four varieties of silk, namely, mulberry, tasar, eri and muga.

1.2 Majority of the farmers in India are small and marginal farmers having holdings less than 2 hectares. Their income is generally inadequate in relation to the requirements. Further, disguised and seasonal unemployment is an important feature of Indian agriculture. There is, thus, need for having subsidiary occupations to provide full time employment for farmers throughout the year particularly the marginal farmers and those farmers raising a single crop in rainfed areas. Among such occupations, sericulture, being a labour intensive industry, can play a significant role. It is estimated to have provided full or part time employment for about 3.2 million persons at the end of 1965-66, of

which 2.5 million were engaged in mulberry cultivation, silkworm rearing and silkworm seed production. Most of the cocoon rearers are small and marginal farmers who grow their own mulberry or collect the mulberry leaves for the feeding of the silkworms. Therefore, development of sericulture is important from the point of view of raising the level of income of the weaker sections of the population.

1.3 Silk industry is also an important source of foreign exchange earnings. Currently, about 45 lakh sq. metres of silk fabrics valued at Rs. 7 crores and nearly 6 lakh kg of silk waste worth Rs. 53 lakhs are being exported. World demand for silk has shown an increase of 21 per cent from 36,935 tons to 44,669 tons over the period 1966 to 1970. During the years 1968-1970, demand for silk in India rose by 28.5 per cent as against 28.4 per cent in South Korea, 18.8 per cent in Japan and 14.6 per cent in Italy. The indications are that there will be a continued and rising demand for silk in India in the foreseeable future. The research work already done in several parts of the country is also a testimony to the fact that there is a good base for developing sericulture. There are, however, some problems still to be tackled. Mention of these problems has been made in this Report. Large scale expansion of this industry will substantially benefit the small and marginal farmers and artisans and is thus welcome from the point of view of achieving the objective of "Growth with Social Justice".

1.4 One of the Terms of Reference given to the National Commission on Agriculture relates to the study of the problems of small farmers and agricultural labourers in the context of social justice and equality of opportunity and as a factor in securing effective participation of the bulk of the Indian peasantry in stepping up agricultural production. The Commission has already submitted two Interim Reports to the Government, one on "Milk Production through Small and Marginal Farmers and Agricultural Labourers" and the other on "Credit Services for Small and Marginal Farmers and Agricultural Labourers". In this Report the Commission has attempted to highlight the problems which need immediate attention in regard to sericulture in so far as they relate to improvement of economic conditions of small and marginal farmers. A questionnaire (Appendix I) was issued to the major silk producing States as also the Central Silk Board for eliciting information on certain important aspects of sericulture. Besides, some Members of the Commission visited the Central Sericultural Research and Training Institute, Mysore and also held discussions in some major silk producing States with scientists at different levels and with officers of the concerned State Departments. The replies to the

Questionnaire, in addition to the discussions referred to above, have been critically analysed in order to arrive at conclusions and formulate recommendations on some important issues concerning sericulture. Sericulture in its broader perspective will, however, be dealt with in the Final Report of the Commission.



SECTION II

PRESENT STATUS OF SERICULTURE

2.1 Sericulture industry has, in general, two facets relating to (a) production of mulberry and cocoons; and (b) production of raw silk and utilisation of by-products. While the first part comprising mulberry cultivation, seed production and silkworm rearing is agricultural in character, the second part dealing with production of raw silk and spun silk yarn is essentially organised on cottage and small industry basis. Mulberry silk accounts for 2,143 tonnes or about 79 per cent of the total silk production. The production of mulberry silk is largely concentrated in Mysore, Jammu & Kashmir, West Bengal and Uttar Pradesh, which together share 99 per cent (or 2,125 tonnes) of the total production of mulberry silk. Mysore alone accounts for nearly 85 per cent. This is evident from the following table:

Table 1 - Area and Production of Mulberry Silk (1971)

State	Area under Mulberry (Hectares)	Production (Tonnes)	
		Mulberry silk	Non-Mulberry silk
1. Mysore	94,349	1810	-
2. West Bengal	5,380	263	13
3. Jammu & Kashmir	*	48	-
4. Uttar Pradesh	246	4	-
5. Tamil Nadu	2,896	2	-
6. Madhya Pradesh	100	1	125
7. Other States	1,914	15	439
ALL INDIA	<u>104,885</u>	<u>2143</u>	<u>577</u>

* 24 lakh trees

Source: 1972 Statistical Biennial - Silk in India - Central Silk Board

2.2 In Mysore, sericulture has had State support for a long time. The local race of silkworm has been maintained by legally enforcing a ban on the introduction of any other race of moth in the area. Bulk of silk is produced from the Mysore race of silkworm. The State Government has, through research and development efforts, evolved a crossbred between the Mysore race and the exotic race after trying various combinations. The silk produced by the crossbred is of finer quality and of greater length. Various exotics have been tried to improve the crossbred quality.

2.3 Mulberry is grown in bush form in Mysore State. This gives maximum yield of leaf per hectare and also enables the leaf to be obtained in tender condition to feed the silkworms. After experimentation, suitable varieties have been released for cultivation by the farmers. Mulberry is generally grown under rainfed conditions in some parts of the State whereas in other parts it is grown under irrigation. Mulberry under irrigation gives better yields. Farmers have started developing irrigation potential by investing in irrigation wells even in the areas where rainfed mulberry was common.

2.4 The economics of cocoon production using crossbred silkworms on one-hectare farm under rainfed

and irrigated conditions is given in Table below:

Table 2 - Economics of Cocoon Production on one-
hectare Farm per annum under Rainfed and Irrigated
Conditions (1970)

(In rupees)

Item	Rainfed conditions	Irrigated conditions
1	2	3
<u>I. Cost of cultivation</u>		
1. Manure	100	200
2. Fertiliser	-	405
3. Cultural operations	505	2022.50*
Total I	<u>605</u>	<u>2627.50</u>
<u>II. Cost of Rearing</u>		
4(a) No. of disease free Larvings (Dfls)	1125	3325
4(b) Cost @ Rs. 10/- per 100 Dfls	112.50	332.50
5. Labour (excluding family labour)	110.00	332.50
Total II	<u>222.50</u>	<u>665.50</u>
III. Total paid-out cost (I+II)	<u>827.50</u>	<u>3292.50</u>
<u>IV. Sale of cocoons</u>		
(a) Output (Kg)	245	800
(b) Value**	1960	8000
<u>V. Return</u>		
(IV(b) minus III)	<u>1132.50</u>	<u>4707.50</u>

* Including irrigation charges

** At the rate of Rs. 8/- per kg under rainfed conditions and Rs. 10/- per kg under irrigated conditions.

Note: Data relate to Mysore State; it was supplied by Central Silk Board.

The estimates of expenditure included in the above table relate to paid-out costs only and do not include overhead expenses like depreciation, interest on capital, etc., and items such as family labour. If appropriate allowance is made for these items of cost, then the net income from cocoon production on one hectare of land under mulberry would be correspondingly smaller. It may also be mentioned that the small and marginal farmers engaged in mulberry cultivation grow other crops also on their small holdings. Similarly, those engaged in activities such as silk reeling have other occupations, particularly in the off-season. Thus, sericulture augments the income of the small and marginal farmers and artisans considerably.

2.5 In case the area actually under mulberry cultivation happens to be less than one hectare of irrigated or rainfed area, the income will be correspondingly less; however, for holdings of smaller sizes the overhead cost per hectare will be relatively higher and to this extent the net income will be lower than the proportionate share worked out on the basis of the size of area under mulberry cultivation. Still, the net income from cocoon production will be more as compared to that from other crops. Also, mulberry cultivation and associated activities will provide fuller employment not only to the small and marginal farmers but also for other artisans engaged in activities such as silk reeling, spinning, etc.

2.6 Reeling is done largely with cottage basin or charka basin. If the farmers can get over the prejudice of not killing the moth by boiling the cocoon for reeling, they can earn further income to add to their meagre earnings. They will also thereby avoid their dependence on the middlemen silk reelers who, many a time, attempt to push down the cocoon prices. By increasing the production and by improving the quality, it should be possible to give additional income to a large population of small and marginal farmers and artisans.

2.7 Next to Mysore, West Bengal is the second largest producer of raw silk in the country. Cocoon rearing takes place mainly in the Malda district and its neighbourhood. The seed supply is from the Central Sericultural Research Station, Berhampore in Murshidabad. Mulberry is grown in bushes and the rainfed yields are as high as 16,000 kg per acre comparable with the irrigated yields in Mysore. From the point of tender mulberry and the low price of mulberry leaves, West Bengal has great potential in sericulture. The rearing of cocoons is confined to the winter and spring seasons when the climate appears to be the best suited for rearing. Sericulture requires low humidity and temperature ranging from 21°C to 23°C; this appears to be prevailing in West Bengal

only in the winter and spring months. In summer, the temperature is high and in the rainy season the humidity is very high. Four crops per year in the winter and spring seasons appear to be normal. Local races of silkworm and pure bivoltine races and crossbreds between bivoltine exotic and local races are used. The pure bivoltine exotic fetch a good price in the market. The rearers also maintain their own charka basins for reeling the silk from cocoons. Further, the cocoons are sold to reelers who own cottage basins. The State Filature Unit at Madhughat in Malda district produces filature silk. There are a couple of organised markets. The raw silk markets are mostly organised by silk dealers, though some reelers are able to trade with Banaras silk merchants directly.

2.8 Kashmir is the State producing largest quantity of finer quality silk from the pure exotic races of silkworms. Sericulture has been kept as a State monopoly in this State. Land being scarce, mulberry is grown in tree form. Mulberry trees cannot be cut without the permission of the State Government even if they are on private lands. Government lands and field boundaries are planted with mulberry. Collection of mulberry leaves in the silkworm rearing area is allowed free to whosoever wants it for rearing. The State uses univoltine exotic races of silkworm which are obtained from Japan, South Korea, Italy and USSR. The races are

maintained in suitable grainages in the State. As there is only one hatching in the year, the eggs are kept in cold storage for hibernation for most of the year and are taken out and incubated just before the cocoon rearing season starts in May and June. The seeds after incubation are supplied to the rearers. It is complained that the exotic races do not appear to perform well after two or three generations in the grainages. The yield for the pure races of seeds in various years is given in the table below:

Table 3 - Yield of Cocoons from the per-ounce Imported Seed as Compared to the Local Seed *

(In kilograms)

Race	1964	1965	1966	1967	1968	1969	1970
1	2	3	4	5	6	7	8
Japanese	22.53	25.91	29.46	35.18	37.98	-	38.16
Korean	-	-	-	31.93	30.59	26.67	38.59
Italian	-	-	-	-	-	-	31.46
Russian	-	18.66	-	-	-	-	-
Local (E-1)	16.00	14.46	21.30	16.24	16.23	12.14	15.46

It will be seen that in 1970 the races from Japan, Korea and Italy produced more than double that of the local races of India.

*Source: Government of Jammu and Kashmir.

2.9 The farmer's family spends 30 to 40 days in rearing one brood in May-June. The rearing is done in one room of the house where there is facility for heating the room with local charcoal. This is necessary because the temperature has to be kept between 21°C to 23°C . The State Government buys off all the cocoons and pays a price which is calculated on the silk price and the expenses that it has to incur. The net income per family was assessed in 1969 at only Rs. 170/- for 30 to 40 days hard work for two to three persons in the family. There is a suspicion that not all the cocoons grown come into the Government's hands. Though smuggling is difficult, it is equally not understandable how these people who can easily get wages of Rs. 7/- or Rs. 8/- per day during the tourist season in May and June in the Kashmir Valley, can be satisfied with an earning of Rs. 170/- for two to three persons for hard work during 30 to 40 days in this season. Mulberry leaves are available for about 8 months in the year. In Jammu they are available for a longer period. It is difficult to understand why attempts have not been made to develop three broods a year. As we shall explain later, the Central Sericultural Research and Training Institute, Mysore, has found it possible to continuously rear bivoltine pure races of exotics. The only reason for the continuation of univoltine races in Kashmir

is that in Russia and Central European countries only the univoltine races are being used. Kashmir seems to compare itself with these countries and not with Japan where three broods a year are being produced.

2.10 Uttar Pradesh obtains pure exotic breed from Kashmir and one crop is raised in March-April and another in September-October. It is reported that in the other months of the year, it is either too humid/rainy or too hot for silkworm rearing in the State. This obviously applies to the plain areas. There is no rearing in the hilly areas of Uttar Pradesh. Mulberry leaves are collected from trees. The bush varieties are not known. The State authorities rear the silkworms upto second moult and then supply the chawkies to the rearers for further rearing into cocoons. Their capacity to supply chawkies after second moult in time to the rearers is limited. The State Government has provided stifling units in Saharanpur, Dehradun and Etawah to enable the cooperatives to organise the rearers to stifle the cocoons. Cooperatives have been formed of the rearers in various districts, and there is an Apex Cooperative Body which maintains a Silk Filature Unit at Premnagar, Dehradun where the cocoons are gathered and the silk is reeled. As the figures indicate, the present silk production in Uttar Pradesh is very modest considering the potentiality for development in the State.

2.11 In regard to the organisational set-up, the Central Silk Board was established by the Government of India in April, 1949 under the Central Silk Board Act LXI of 1948 with a view to providing for the coordinated development of the silk industry under Central control. In its earlier years the Board mainly functioned as an advisory body in the formulation and implementation of plans for development of sericulture industry. Since 1958, however, the Board became directly involved in the development of silk industry and took over the entire responsibility to organise sericulture research and basic seed supply as also the post-graduate training in sericulture. The Board's functions were further enlarged in April, 1970 when it was made the sole canalising agency for the import of raw silk. The Board is now under the control of Ministry of Industrial Development and is entrusted with the responsibility of developing silk industry on an all-India basis covering almost every field of activity connected with silk. For conducting research and training in sericulture the Board has Central Sericultural Research and Training Institute in Mysore. This apart, there is a Central Sericultural Research Station at Berhampore and a Central Sericultural Research Sub-Station in Kalimpong. In addition, there are two Silkworm Seed Stations at Pampore in Jammu & Kashmir and Coonoor in Tamil Nadu.

SECTION III

PROBLEMS OF SERICULTURE

3.1 An assessment of the present position about sericulture in the country has thrown up some serious shortcomings. There may be historical reasons for the present state of affairs, but it is evidently desirable to improve and modernise the techniques on the basis of the pooled experience available in the country.

The economics of silk production is the crucial factor in evolving sericulture programme for the small and marginal farmers whom we have primarily in view. The economics of silk production is based on the following main factors:-

- (a) Conversion factor of mulberry leaves to cocoons - the weight parities;
- (b) quality of filament and its length in the cocoon; and
- (c) the rendita - the proportion by weight of reeled raw silk in a cocoon.

3.2 Under the existing plantation techniques the high cost of inputs is not adequately compensated by a corresponding higher yield of mulberry due to two reasons. Firstly, application of manures and provision of irrigation facilities are not systematised. Secondly the quantum of financial assistance to the growers

and rearers towards sinking of wells and construction of rearing houses is extremely limited. The cost of production of mulberry leaves is an important element in the economics of silk production. At present roughly 25 kg mulberry leaves are required to produce 1 kg cocoon. The quality of the leaves also has an effect on the quality of the silk produced. The bush form of mulberry which is harvested close to the ground every seven weeks or so has been found to give the best quality of leaves for silkworm rearing. In Mysore where the largest quantity of silk is produced and where mulberry is grown under rainfed conditions in large part of the area, the cost of production of one kg mulberry leaves by the traditional method is as high as 36 paise. On the other hand, in West Bengal because of the favourable soil and climatic conditions one kg mulberry leaves cost as little as 10 paise under rainfed conditions. Another important factor to be borne in mind is that there are no organised markets for sale of mulberry leaves in Mysore, West Bengal and Uttar Pradesh. In West Bengal for the sale of cocoons also there is no organised market.

3.3 The quality of filament and its length are the best in the pure exotic race and that too in the beginning soon after import of the seed from the

foreign countries. It is noticed that though the Central Sericultural Research and Training Institute, Mysore tries to maintain the pure race in Kashmir and supplies the layings for development to different States; the further generations in the commercial handling deteriorate as they do not get acclimatised. This deterioration is particularly found in West Bengal where the main difficulty in developing pure exotic races is the variation in temperature and humidity in between the rearing periods. Further, in the cross-breeds and bivoltine exotics in use, it has not been possible to obtain so far in the commercial layings any quality even of the Grade 'B', let alone the higher grades.

3.4 The third important factor is rendita which means the proportion by weight of reeled raw silk in a cocoon. In other words, it stands for the quantity of cocoons required for producing a kilogram of raw silk. The pure exotic race gives a low percentage of rendita whereas in the case of local and crossbred races the percentage is comparatively higher. Scientific efforts will have to aim at reducing the rendita of various breeds in the country.

3.5 Small quantities of cocoons are sun-dried by the rearers. In case of large establishments like filatures, where the daily consumption is enormous and they have

also to store cocoons for sufficiently long periods, the cocoons have to be stifled and stored properly in time. In Jammu & Kashmir and Mysore these filatures are provided with steam or hot air stifling chambers. In the case of steam stifling, the cocoons have to be dried and freed from all moisture to become fit for storage for a period of 3 to 6 months. While in the case of Jammu & Kashmir filatures hot air drying chambers are available, where they can stifle the cocoons and store them for long periods, technologically the present equipment and also the methods of drying are far from satisfactory.

3.6 The sale of cocoons is by and large done through the open market system. Since rearing is mostly practised as cottage industry, there are no elaborate methods for the testing of cocoons prior to the sale transactions. Further, there is no exclusive organisation to ensure a guaranteed price for the cocoon producers. On account of the fluctuations in the demand for raw silk and silk fabrics and also due to erratic seasonal variations, the demand and supply ratio mostly remains in a fluid condition. The need for rationalising the prices of cocoons and raw silk is obvious.

3.7 The small and marginal farmer has to invest capital in preparing a suitable rearing room and organising equipment for rearing the silkworms. The annual

depreciation of capital is independent of the number of rearings that the farmer is able to achieve in the year. In Mysore, the farmer can have as many as six rearings. This gives the best return on capital investment. On the other hand, in Kashmir the farmer has only one rearing. In Uttar Pradesh he has only two rearings, whereas in West Bengal he has four rearings per year. If methods could be found to enable the farmers to increase the number of rearings, the economics of silkworm rearers would certainly be improved.

3.8 Mortality of silkworms during the period of rearing is largely due to diseases like pebrine, flacheric and grasseric, depending on seasonal conditions. Even in indoor rearing, mortality varies between 20 and 35 per cent. This has to be tackled on a priority basis. This could be reduced through the adoption of improved method of rearing evolved at the Central Research and Training Institute, Mysore.

3.9 Mysore and West Bengal where the best quality of mulberry is grown in the bush form, produce the highest percentage of silk of local races. It will be of great benefit to the farmers if suitable exotic races and high quality crossbreds which can give better return to the farmers with the

same expenditure on mulberry leaves are introduced. In Kashmir and Uttar Pradesh, the tree form of mulberry is used. The tree leaves are not as nutritive as the bush leaves, but still the pure exotic races are grown only in Kashmir and Uttar Pradesh. It will, therefore, be of help if the bush form of mulberry can be introduced in Kashmir and Uttar Pradesh. Simultaneously the number of rearings has to be increased so as to make mulberry cultivation economical.



SECTION IV

RESEARCH STATUS AND REQUIREMENTS

4.1 The Central Sericultural Research and Training Institute, Mysore is giving basic support in research and development to the sericulture programme in Mysore. This Institute has done systematic work and there are a number of useful research findings, which require rapid translation into the field. It has tested and released suitable mulberry varieties. The Institute has also worked out the best spacing of mulberry plants under rainfed conditions and better methods of application of fertilisers and water to the crop. The present status of the research work is that if the farmers follow the recommendations for rainfed mulberry, the cost of production of 1 kg mulberry leaf under prime conditions would be 25 paise only as against 36 paise under the traditional method. Further, the yield of leaf per hectare under the new method would be double that under the traditional method. This finding is of great value to the small and marginal farmer who depends on silkworm rearing as an important subsidiary occupation. He can better utilise his small area of land for growing mulberry by following ^{the} package of practices recommended by the Institute.

For irrigated mulberry, the Institute has worked out a routine by which the cost of production of leaf works out to 17 paise per kg as against 23 paise under the traditional method. The yield of leaf increases from 15,000 kg to 30,000 kg per hectare. Where ground water is available, the small and marginal farmer will benefit very substantially by growing mulberry with irrigation.

4.2 The Institute has also worked out the best methods of harvesting of the bushes for retention of optimum moisture and protein content. It has been reported that leaves of two to two and a half months age in closely planted gardens with proper nitrogen fertilisation and irrigation normally contain optimum moisture and protein which in turn leads to 20 to 30 per cent improvement in yields of cocoon both in quality and quantity.

4.3 The traditional method uses 25 kg leaf to produce 1 kg cocoons. The Institute has found out that the first two moults of silkworms require a higher humidity than normally available in the atmosphere and better absorption of the leaves is possible by allowing greater space for the silkworms than what the traditional breeder allows. The Institute has developed simple trays in which, with the use of suitable oiled paper and cover, humidity can be maintained for the first two moults.

The leaves are cut in bigger size than the traditional. Thereby, instead of about 8 feeds during the day, the feeds are reduced to 5 and in the laboratory conditions it has been possible to reduce the leaf-cocoon ratio from 25:1 to below 20:1. The experiment repeated under farmer's conditions has shown a ratio of 21:1. This is a substantial improvement and will immensely benefit the economics of the farmer who depends on his small holding for sericulture. By the two methods of package of practices for growing the mulberry and proper utilisation in the feeding routine, the per hectare return in cocoons becomes substantial. The only additional input will be the farmer's extra labour, if any, in handling the larger brood.

4.4 The Institute has established that it is possible to rear bivoltine hybrids in Mysore during all the seasons. The bivoltine hybrid silk is of superior quality and reaches export standards and the return in value to the rearer is very substantial. Various bivoltine hybrids have already been tried and the experiment has been repeated on a large scale in the State Research Stations at Central Sericultural Research

and Training Institute sub-Station, Melur and State Government Silk Farm, Hosur in Dharampuri district. The Centre at Melur was subsequently transferred to Lalgondahalli in August-September, 1971, owing to shortage of leaf. Rearing methods established under laboratory conditions at the Research Stations have proved to be successful in the field. Eight farmers were selected in Kolar district in the irrigated mulberry area and the experiment was repeated on their farms. Results of the experiment show that the techniques of rearing bivoltine hybrids are transferable to the field. This is an important development in sericulture in Mysore and if this can be rapidly developed in other irrigated areas in Mysore, it should be possible to convert the entire irrigated mulberry zone into bivoltine hybrid rearing which should have at least 2000 tonnes of bivoltine silk annually. This will incidentally reduce the perennial losses faced by the State Filature Unit.

4.5 In one extension trial conducted by the Central Institute, the farmer's traditional practice of growing mulberry and rearing cocoons from crossbreds was compared with mulberry grown under the package of practices with a selected multivoltine hybrid reared under the conditions of the Central Institute during the period February-March, 1971 to February-March 1972. The results are significant,

as will be seen in the following table:

Table 4 - Comparison of results in the extension trial between traditional practice and package of practices*

S.No.	Item	Traditional Practice	Package of Practices
1	2	3	4
1.	Area (acres)	0.3	0.3
2.	Yield of Mulberry leaf (kg)	365	4094
3.	Cocoon production (kg)	21.022	207.900
4.	Rendita	13.9 to 19.2	7.7 to 8.9
5.	Leaf-cocoon ratio	25:1	21:1
6.	Silk production (kg)	0.913	24.490
7.	Cocoon weight (gm)	1.110	1.522
8.	Shell weight (gm)	0.139	0.269

The above table gives a good picture of the advantage in following the package of practices now evolved at the Central Institute.

4.6 In the bivoltine hybrid field trials, eight rearers were selected in the 3 taluks of Kolar area - Kolar, Chintamani and Sidlaghatta.

A total of 625 disease-free layings of the hybrids Nan Mung 60 x Kalimpong 'A' and 975 disease-free layings of reciprocal cross were prepared and Chawkie silk-worms were reared at the Government Silk Farm, Lalgondahalli. The larvae were distributed

* Source: Annual Administration and Scientific Report 1971-72, Central Research and training Institute, Mysore (pages 109-116).

to the rearers. Two of the sericulturists did not follow the instructions meticulously. On an average, the results show a yield of 610 kg cocoons for 1600 disease-free layings. This works out to 38.3 kg per 100 disease-free layings, which favourably compares with 20 to 25 kg for 100 layings reached in the traditional method. Individual cocoon weight is 1.527 gm and the shell weight is 0.247 gm. Excluding the performance of the two sericulturists who did not follow the advice properly the results obtained are 40.7 kg cocoons per 100 disease-free layings, cocoon weight 1.564 gm and the shell weight 0.256 gm.

4.7 The Central Institute, Mysore is doing systematic work and has already achieved good results which can give an immediate boost to both the quantity and quality of production of silk in the State of Mysore. West Bengal where good mulberry leaf is available, cheaper than in Mysore and where 4 rearings are done during the year, is now concentrating mainly on local breeds and bivoltine exotics. The Berhampore Central Research Station will now have to test and adapt many of the research findings of Central Institute, Mysore to suit the West Bengal conditions and further develop them so that in West Bengal it may be possible to have a combination of rearing two

local and two bivoltine races during the year. Mulberry leaf is already cheap enough at 10 paise per kg. Neither the State Government nor the Berhampore Central Research Station is taking advantage of this basic beneficial factor.



SECTION V
SCOPE FOR IMPROVEMENT

5.1 The analysis by the Central Silk Board vide Table 2 in paragraph 2.4 in Section II shows that an area of one hectare under irrigated conditions can yield enough to a small and marginal farmer to bring him up well above the minimum need level. In fact, the income derived from sericulture on one hectare will be much higher in comparison to that from other crops on the same area. The demand for silk is rising in the world and in India too. With proper husbandry, India should be in a position to cater to a reasonable share of the rising demand. The future demand for silk will have a quality dimension which would perhaps be more important than the quantitative increase in demand. The problem is thus not merely of producing more but also of high quality silk in the country. In case this becomes possible, an important field of agricultural production would be thrown open to the small and marginal farmers in certain selected areas of the country which can provide them means of sustenance above the level of minimum need.

5.2 Sericulture in India has so far developed on traditional lines. There have been some cases of localised development in various parts of the country because of the strong historical background of the industry in the area. The knowledge gained in one area does not appear to have been transferred to the other areas with a view to improving the economics of production and increasing returns to the farmer. The traditional sericulture is based substantially on the local races and the bulk of the silk production in the country is from them. The exotic races have been tried in Jammu & Kashmir and Uttar Pradesh but the programme has not expanded. For competing in the world markets it is essential to produce good quality silk. The economics of silk production depends largely on the following three factors as has already been indicated in Section III:-

- (a) Conversion factor of mulberry leaves to silk cocoons - the weight parities;
- (b) quality of filament and its length in the cocoon; and
- (c) the rendita - the proportion by weight of reeled raw silk in a cocoon.

The Central Sericultural Research and Training Institute, Mysore has done important work in this direction and in Section IV we have analysed the latest

position about the results so far achieved. While much more work needs to be done in Mysore and further supporting work is necessary in other important silk producing States like West Bengal, Uttar Pradesh and Jammu & Kashmir, the findings of the work already done can go quite some way in improving the economics of silk production.

Mention may be made of the following findings:-

- (a) Methods have been found to increase the cocoon-leaf ratio by improved methods of feeding the first two moults of the silkworms under controlled heavy humidity conditions and following up with improved leaf preparation practices for the further moults.
- (b) In Mysore bivoltine crosses have been cultivated at the field level, which give substantially higher quality and length of filament.
- (c) The improved local races and the races selected for crossing have reduced the rendita of the traditional types of silk produced in Mysore. In addition, the new bivoltine crosses give lower rendita.

5.3 In addition to these findings, better methods of bush mulberry propagation under rainfed and irrigated conditions have been developed so that the per hectare yield of leaves is increased more than twice the traditional yield. Thereby, the per hectare return of leaves and hence return in cocoons is increased, leading to better economy per holding. This work has, however, only been done under Mysore conditions. It should be possible

to bring about similar improvements in the other important States particularly West Bengal, Uttar Pradesh and Jammu & Kashmir. In view of this, we recommend in the following paragraphs suitable plan of action for the major sericulture States as a first step towards modernising the sericulture industry.

MYSORE

5.4 The Central Sericultural Research and Training Institute, Mysore has evolved a method of rearing bivoltine hybrids in various seasons of the year. Where mulberry is grown under irrigated conditions, the returns per unit of area are very high. It is necessary to draw up a phased programme of introduction of the bivoltine hybrids in the irrigated mulberry areas of Mysore, particularly Kolar and Chennapatna. During the Fifth Plan period, the Kolar and Chennapatna areas should be saturated with the programme. Suitable grainages should be located for the preparation of the layings for supply to these areas because in the initial stages it is necessary to introduce supply of chawkies of silkworms to the rearers so that they have not to wait till they learn the new techniques. It may also be stated that, between the time the grainages are established and

the time by which they reach their capacity, there is always a time lag and if production has to be kept up to the planned level even during this interval, it will be necessary to seek for imports of the seed material. Necessary provision may be made for this. A strong extension organisation should also be located in these districts by the State Government to help the farmers in undertaking this programme.

5.5 The Central Research and Training Institute has got a very rudimentary extension organisation. As a result, important findings of this Institute take time to reach the farmer. The bivoltine hybrid programme will specially require a strong action group in the Institute to be in constant touch with the field extension organisation of the State Government in Kolar and Chennapatna districts so that the various teething troubles can be attended to by the Central Institute promptly and solutions found. The Central Institute should be enabled to produce the nucleus seed and multiply the same in further stages in sufficient quantities at the State Seed Research and Multiplication Stations. As new strains will be continuously evolved, it is

desirable that strong extension units are added to the State organisations in particular and also to the Central Institute. This Extension Organisation at the Central Institute must comprise of the experts from the several disciplines involved in the new programme and should be additional to the present staff; at the same time, they should be involved in the research also so that they are kept in the main stream of the research programme and can transfer the ideas properly to the farmers.

5.6 One of the important techniques developed in the Central Institute is the rearing of the first two moults of silkworms in special trays where by using oil/paper and wet compressors high humidity is maintained. By following this method the rearer is able to avoid the high mortality usually found in the rearing of silkworms from egg to cocoon stage. There is also saving in the leaf. Further, the Institute has combined this practice with modified chopping of the mulberry leaf so as to have larger pieces. This also appears to save on the feed. The package of practices evolved for new methods of leaf chopping and modified trays for the first two moults and the larger area for the subsequent

moult has given less mortality of the silkworms and a higher cocoon to leaf ratio than the traditional method that is being followed. It would be in the interest of the economy of the Mysore silk rearer that he is made to change over quickly to the new practice. A phased programme to cover the entire sericulture area with the new practice during the Fifth Plan period should be drawn up by the State Government and the extension and training organisation built up to ensure this. The extension organisation of the Central Institute should also supervise this programme in the field to guide the State Extension Workers and to take part in the training programme for Extension Workers.

5.7 In Japan, a community arrangement is made in the villages to supply ~~chowkies~~ of silkworms to the rearers. By this means the first two moults are controlled by well trained personnel and the ~~chowky~~ ^{Chowky} supplied improves the yield from the laying.

In Mysore, such a community approach in the villages can perhaps solve some important problems faced by the rearer. In the villages where silk worm rearing is done by a large number of the families taking part in the programme, it should be possible to organise Central chawkie supply units on a cooperative basis. Such units can

use the latest methods recommended by the Central Research and Training Institute for rearing the first two moults in special trays with high humidity levels. It should also be possible for the community centre to organise the reeling of the cocoons produced in the village. The individual farmer will not be able to afford anything but a charka reeling unit. The community centre can handle easily a cottage basin. Thereby, the quality of the filament also improves. For both these reasons, the Commission recommends that in the villages where there are large groups of rearers, such cooperative chawkie rearing-cum-reeling units should be organised during the Fifth Plan period. For this purpose, the managerial subsidy given in the cooperative system should be forthcoming for these ventures. Such units will also facilitate expert supervision by the Extension Organisations of both the State Government and the Central Institute. It is much easier to handle a limited number of such cooperatives than a large number of individual farmers.

5.8 The bivoltine hybrids would be limited to the irrigated areas. In the unirrigated areas bulk of the rearing would be with the local Mysore race. This race is being improved and selections made at the Central Research and Training Institute. Already

three strains - Hosa Mysore-I, Hosa-Mysore-II and Hosa-Mysore-III have been released for field use.

Though these strains are superior to the traditional pure Mysore race in that the percentage of silk is higher, the results achieved so far are not satisfactory uniformly over all the seasons.

Cross-breeding with exotic races has also shown a higher percentage of failures not only in Mysore but in Tamil Nadu also. More research effort is, therefore, required in the matter of cross-breeding the local and exotic strains.

Besides crossbreeding, the testing and improvement of the high quality bivoltine exotics have to be a continuing process. It is desirable to introduce newer and better strains all over the State in a phased manner during the Fifth Plan period.

For this purpose, provision of grainages and stations for the multiplication of the foundation stock would have to be increased in the State.

5.9 Much of the silkworm rearing areas in Mysore would have to depend on ground water exploitation for raising mulberry under irrigated conditions. The ground water is scanty and can be tapped mainly by open wells. The wells are usually in rocky strata or gravelley soil and quite deep sometimes. A well which can irrigate a little

more than one hectare of mulberry throughout the year may cost as much as Rs. 5,000/-. This is a heavy investment for small and marginal farmers. Since, however, sericulture gives the best return on the irrigated land, a subsidised programme of digging open wells for mulberry plantations by the small and marginal farmers in the silkworm rearing areas where ground water is reasonably assured would be desirable as a measure of social justice. This programme, tied up with the programme of rearing of bivoltine hybrids, will increase manifold the silk production from that area. The Commission, therefore, recommends that the small and marginal farmers may be given 25 per cent Central subsidy on digging of wells under the sericulture development programme to be financed by the Central Silk Board.


WEST BENGAL

5.10 Next to Mysore, West Bengal produces the largest quantity of silk. The present silk industry is concentrated mostly in the Malda district and comprises by and large local varieties which are of poor quality. It is necessary to bring about improvements in the direction of increasing the number of crops per year, reducing the rendita and improving the silk quality, increase in the number of rearers and the quantity of silk produce

5.11 In Malda district four crops of local races are taken in a year. The Central Research Station, Berhampore is reported to have already developed many good heat resistant strains suitable to local conditions. It is essential to take up a crash programme to test the suitability of these strains before steps are taken to introduce them on a wide scale in the State through a phased extension programme as is suggested for Mysore. There is a tradition of rearing the pure bivoltine races in this district though on a very limited scale. A programme to introduce suitable bivoltine hybrids on a large scale, therefore, needs to be undertaken. With the evolution of new races it would be possible for the farmer to have four crops in a year - two local and two bivoltine. Such a crop sequence would improve his economy.

5.12 The districts of Bankura, Purulia and Birbhum seem to have favourable humidity and temperature conditions for silkworm rearing. Also, in Bankura and Birbhum there are Kangsabati and Mayurakshi irrigation projects which can support the raising of mulberry under irrigated conditions. It is worth investing in pilot

field stations of the Berhampore Central Research Station immediately in these districts to establish the suitability of mulberry cultivation under irrigated conditions and explore the possibility of introduction of bivoltine hybrids. A suitable project may be developed by the Central Research Station for the Fifth Plan period for the establishment and the running of such field stations. From the fourth year of the Fifth Plan a field extension programme should also be added to each field station. The State Government should give all assistance to the Central Research Station by allotting land for the stations in the irrigated commands of ~~Kangsabati~~ and Mayurakshi projects and also at a suitable location in Purulia district. It is in the interests of the State to get these centres established quickly and have the work started. If the results of the scheme prove that irrigated mulberry can be grown and bivoltine hybrids can be reared three or four times a year, substantial income to the small and marginal farmers in these districts can be ensured. It may be noted that many of the small and marginal farmers in these districts are from the scheduled tribes and backward classes.

5.13 The Berhampore Central Research Station will have to undertake a substantial amount of applied

research work on the lines of the Central Institute, Mysore to select the strains suitable for the local conditions and to continuously improve them. Luckily, mulberry leaf is very cheap in West Bengal and it is hoped that the methods evolved at Mysore can be translated without much difficulty to suit the conditions in the new mulberry areas in Birbhum, Purulia and Bankura districts. The Berhampore Central Research Station with its proposed field stations in these districts should take up a comprehensive applied research programme as is being done in Mysore. Suitable programme should be drawn up by the State Government and sanctioned by the Central Silk Board and the Ministry of Industrial Development on a priority basis.

JAMMU AND KASHMIR

5.14 The present system of silkworm rearing in Jammu & Kashmir is not very remunerative to the rearers. There is every likelihood that without substantial improvement in his income, the small and marginal farmers may give up silkworm rearing as a vocation. One way of increasing their income is to reduce the charges at which chawkies of

silkworms are being supplied to farmers by the State Government. The State Government has to maintain an elaborate organisation of grainages to store the seeds over the year and incubate them for one crop in the spring. This necessarily puts all the overheads on one crop. Costs can be reduced if more than one crop can be raised in one year. The future programme will have to pay particular attention to this aspect.

5.15 The State is concentrating on univoltine races which give only one brood per year. This is said to be on the basis of the present practice in Central Asia. Japan which has got much more rigorous climate than Jammu & Kashmir can raise three broods in a year and that of the best quality silk. Research will have to be undertaken to identify races or strains which can be introduced in Jammu & Kashmir so that three broods can be raised in a year. The spring is long enough in Jammu & Kashmir and it is the slightly lower temperature that has to be handled during this season. Already there is a practice of using charcoal stoves for heating the rearing room when necessary. Experiments should be conducted with various races from Japan to select suitable bivoltines which yield the desired quality as also the three broods in a year. The Commission recommend that the Central Silkworm Seed Station, Pampore and the

univoltine Research Cell at Majra should tackle this problem on a priority basis.

5.16 The next important aspect of development is the production of good quality mulberry leaves. The tree form is used at present because land is so scarce in the Kashmir Valley. If a three-brood programme is to be introduced in Jammu & Kashmir, it has to be supported by a bush mulberry programme. Suitable areas in the Karewas in Kashmir Valley as also in Jammu can be identified for raising mulberry in bush form. A survey of these areas for introduction of bush mulberry should be carried out quickly.

UTTAR PRADESH

5.17 In Uttar Pradesh where tree mulberry is raised, only two broods are taken up per year at present. Considering that it is possible to cultivate mulberry under irrigated conditions, it is obviously desirable to introduce bush mulberry provided the number of crops can be increased to at least three in a year. Immediate steps will, therefore, have to be taken in the following directions:-

- (a) to carry out applied research to establish whether three crops can be raised in a year and precautions to be taken for the same;

- (b) instead of depending on the bivoltines from Jammu & Kashmir, try and develop bivoltines hybrids suited to the area; and
- (c) to organise a research station for this area to carry out the work expeditiously.

It is only after the base is laid that it will be possible to evolve a large scale field programme for cultivation of bush mulberry involving a larger number of rearers. The technique of extension would have been fully established in Mysore by then and can be safely copied.

G E N E R A L

5.18 The programme of intensive sericulture backed by irrigation requires credit support for the farmer and cocoon rearer. Though growing of mulberry is an agricultural operation, by itself it leads to no benefit unless the chain of operations is completed culminating in the production and sale of raw silk. The entire process starting from the raising of mulberry to the disposal of the raw silk has to be taken on an integrated basis for the purposes of credit support and for developing an economically viable programme of sericulture. The Reserve Bank of India treats the raising of mulberry as an agricultural operation and provides refinance facilities in the cooperative sector at favourable rates. On the other hand, the cocoon reeling and marketing are treated as industrial

operations and are required to be supported from the industrial financing institutions. For best results functional cooperatives have to be organised starting with the raising of mulberry and ending with the disposal of the raw silk.

In view of the substantial benefit that this programme would give to the small and marginal farmers and artisans in the rural areas, the Commission recommends that such functional cooperatives should get their finance from a single source for the entire chain of operations, and this may be authorised by the Agricultural Credit Wing of the Reserve Bank of India. The Commission would also reiterate the recommendations made in this regard in the Interim Report on Credit Services for Small and Marginal Farmers and Agricultural Labourers in December 1971. Sericulture can be included as one of the items in the list of activities of the Farmers' Service Society and the functional District Organisation can be funded by a commercial bank.

5.19 Cocoons as soon as they are formed have to be dried in order to kill the live material inside so as to prevent the emergence of the moth and the

spoiling of the cocoon. There are many methods of drying followed at present, but most of the methods and equipments used appear to be far from satisfactory. There is considerable scope for effecting improvements in the present methods of drying and adapt more rational techniques for ensuring qualitative and quantitative improvements in the raw silk. The research and extension organisation should work in close coordination in order to introduce modern equipment and methods of drying in the field.

5.20 There are wide fluctuations in the cocoon and raw silk prices which affect the stability and progress of sericulture industry in the country. These price fluctuations are quite marked from year to year and between seasons within a year. The year to year fluctuations especially have a disturbing effect and years of low silk prices are followed by drastic reduction in the mulberry area since the growers switch over to other crops. In order to maintain the progress of sericulture industry, there is need to ensure a fair price to the primary producer as also to ensure supply of raw silk to the consumers at a stable price. A view has been expressed that there should be monopoly purchase of silk by the Government. It has also been suggested that if,

monopoly purchases are to be made, they should be on the lines of the auctions held by the Coffee Board. There could be no difference of opinion that there is urgency for having a proper Government policy on this subject.

5.21 We would like to invite a reference to the Report of the Price Stabilisation Committee constituted by the Central Silk Board (December 1972), wherein a recommendation was made to establish a Central Raw Material Bank for maintaining a buffer stock, which was to function under the direct control of the Raw Silk Price Stabilisation Authority. The Committee further recommended that there should be close coordination between the Central Raw Material Bank and the State level organisations to be set up by the States. The Commission supports this recommendation and would urge that early steps should be taken by the Central Silk Board to set up the Central Raw Material Bank as also the regional organisations in the major silk producing States. Further, unlike filature silk which is produced only by the Government filatures, such a regional Bank would have to handle various grades of cottage and charka silk. Since the prices

are linked with quality, operation of price stabilisation system would necessitate the establishment of a chain of testing houses, at least in the more important silk centres. The Commission also recommends that the Central Silk Board should assist in financing the operations of the regional banks as also in the setting up of the testing houses.

5.22 Employment opportunities in sericulture are broadly of two types. Those relating to mulberry cultivation, silkworm rearing and silkworm seed production are rural in nature. Silk reeling and spinning, weaving and dyeing, silk marketing, etc., on the other hand, are undertaken either in semi-urban or in urban areas. As has been stated in paragraph 2.5 above, mulberry cultivation and associated activities will provide fuller employment not only to the small and marginal farmers but also to village artisans. It is estimated that employment potential in silk industry as a whole will reach the level of 4 millions at the end of Fifth Plan, 1978-79, as against 3.5 millions in 1973-74* and 3.2 millions in 1965-66*. Of this, rural activities relating to mulberry cultivation, silkworm rearing and silkworm seed collection will account for an employment potential

*Source: Central Silk Board.

of 3 millions in 1978-79 as against 2.7 millions in 1973-74* and 2.5 millions in 1965-66*. This roughly shows an annual increase of 1.5 per cent in the employment opportunities generated through rural activities of sericulture. It is recognised that reliable statistical data relating to employment in sericulture are essential for the purpose of planning and formulation of development programmes of sericulture. The Commission would, therefore, recommend that all the silk producing States should undertake a quick sample survey through their Statistical Bureaux for collecting estimates regarding the number of persons employed and families engaged in sericulture on a full-time and part-time basis.

5.23 Possibilities for promoting development of sericulture exist not only in the major silk producing States, namely, Mysore, Jammu & Kashmir, West Bengal and Uttar Pradesh, but also in some other States, especially Madhya Pradesh and Tamil Nadu. An attempt has been made to identify some districts in these States which hold potential for sericulture in the Fifth Plan period. At

* Source: Central Silk Board.

Appendix II a list of existing and potential districts has been given. The Commission would recommend that the State Governments should take necessary steps for undertaking the programme of sericulture in the potential districts on the lines suggested in this Section.



SECTION VI

ACKNOWLEDGEMENTS

6.1 The Commission takes this opportunity to thank the Central Silk Board, Central Sericulture Research and Training Institute, Mysore and the State Departments of major silk producing States for providing material to the Questionnaire on sericulture as also for their valuable suggestions during discussions or through correspondence.

6.2 The Commission places on record its appreciation of the valuable contribution made by Shri Sada Nand, Joint Director, in the analysis of the problem and preparation of the Report. Our thanks are also due to Shri Ziley Singh, Assistant Director and Miss Vijay Chopra, Technical Assistant, who have put in the hard and conscientious work in this task.

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Chairman

Sd/- B. Sivaraman
Vice - Chairman

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Sd/- J.S. Sarma
Member Secretary

*On tour abroad.

New Delhi
August 3, 1973.

QUESTIONNAIRE ON SERICULTURE

1. What is the quantity of silk produced in your State? How much of this is silk filature and how much is spun silk out of cocoon waste? What are the varieties of silk that are produced in your State and what are the grades of spun silk produced? Statistics of production, variety-wise and grade-wise, if possible, may be given for the years 1967-68, 1968-69, 1969-70, and 1970-71.
2. What are the types of silkworms now used in the silk production industry? What is the average mortality of silkworms during the process of breeding? When a local breed is used, what are the steps taken to ensure the purity of the breed? Where cross-breeding has been attempted, what are the steps taken to keep up its purity?
3. To what extent your State has been able to get improved types from the Specialised Agencies like the Central Silk Board? What are the difficulties experienced in developing pure exotic lines of silkworms? If seasonal factors are the difficulty, can an industry under air-conditioned buildings be possible? Have the economics of such production been worked out? Can you give the economics?
4. What are the arrangements for growing of Mulberry leaves in your State? What is the acreage under Mulberry? How much of this is under ordinary varieties and how much is under improved varieties? What are the average yields of Mulberry leaves over a period of years? What is the status of the farmers growing the Mulberry? What is the economics of Mulberry production in your State - under dry, rainfed conditions and under irrigated conditions? Give details. What is the price normally paid for Mulberry leaf of various kinds in various seasons? Give details of prices in the various seasons if the prices fluctuate? What is the link up between Mulberry growers and cocoon breeders?
5. What is the organisation for supply of silkworm eggs to the cocoon breeders? Have the cocoon breeders learnt to develop eggs from moths? What is the actual supply line? What is the organisation for cocoon breeders? What is the

technical expertise available to the cocoon breeders in your State? What is the price obtained by the cocoon breeders in several seasons for several varieties during the years 1967-68, 1968-69, 1969-70 and 1970-71? Is there any organisation for giving a guaranteed price to the cocoon breeder for his cocoons? Have you any suggestions in this matter?

6. What is the organisation in your State for silk reeling? How is it made possible for the cocoon breeder to dispose of his cocoons in time for the silk to be produced before the moth breaks out? Have there been complaints of damage to cocoons because of lack of proper market to buy cocoons and process them in time? What is the economics of silk reeling? Give details of various forms of reeling now employed? What is the price obtained for the silk filature and the spun silk in various seasons (1967-68, 1968-69, 1969-70 and 1970-71)?
7. What is the marketing system prevalent in your State for Mulberry leaves, cocoons and silk? Do you consider the system satisfactory from the view-point of the small producer? Does the system allow for exploitation of any link of the chain in the silk production system? Have you any suggestions for improvement?
8. What is the present market for your silk - both filatures and spun silk? How much of the silk is being spun in industries in your State and how much is exported outside your State? Give figures for 1967-68, 1968-69, 1969-70 and 1970-71. Has there been direct export of silk fabrics and silk waste from your State to other countries? Give details, if any.
9. What are the research facilities available in your State to tackle the problem that arise from time to time in developing silk industry from the stage of Mulberry cultivation to weaving of silk?
10. What facilities (extension, credit, input supply) are being offered to Mulberry growers, cocoon breeders and silk reelers through various agencies?
11. What is the number of persons engaged in the various facets of silk industry and what are the potentialities for increasing the employment opportunities through the development of sericulture?

APPENDIX II

List of existing and potential districts for
sericulture development programme

State	Existing Districts	Potential Districts
1	2	3
1. Mysore	1. Kolar 2. Bangalore 3. Tumkur 4. Mandya 5. Mysore	1. Belgaum 2. Dharwar 3. Shimoga
2. Jammu & Kashmir	1. Jammu 2. Srinagar 3. Anantnag 4. Baramulla 5. Udhampur 6. Kathua	1. Punch 2. Doda
3. West Bengal	1. Malda 2. Murshidabad	1. Bankura 2. Purulia 3. Birbhum 4. West Dinajpur 5. Darjeeling
4. Uttar Pradesh	1. Dehradun 2. Saharanpur 3. Etawah	1. Almora 2. Nainital 3. Tehri Garhwal
5. Madhya Pradesh	1. Indore 2. Dhar	1. Sehore 2. Dewas
6. Tamil Nadu	1. Nilgiris	1. Coimbatore 2. North Arcot 3. Tirunelveli