Chapter-9

Summary and Conclusions

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9.1. Introduction

The contribution of sericulture and ericulture as a whole to the total workforce of Assam and particularly in the district of Barpeta, growth of employment in ericulture in Assam, employment per hectare and per unit production of cocoon, contribution to the family income as well as changes in contribution to the NSDP of Assam, generation of employment and income in endi textile industries and its role in the eradication of poverty have been analysed elaborately in different chapters. Spatio-temporal variations in production, engagement of people, area under host plants, and productivity per unit of land under ericulture in Assam have also been analysed. Moreover, comparative study of eri, muga, mulberry and tasar raw silk in terms of production, generation of employment, cost, revenue and profitability per kg of cocoon production and per unit of investment, capital-labour ratio, contribution to foreign exchange earnings have been made elaborately in different sections. In addition to that the economic and non-economic problems of ericulture proper and endi textile industries and its possible prospects, role of various financial agencies in advancing credit to the ericulturists in Assam have been examined in some previous chapters. This chapter is devoted to describe the major findings of the forgoing study and also to throw some light on the policy conclusions emanated from the whole analysis and finally some recommendations have also been provided on the basis of the findings of the study.
9.2 Summary of Findings

The major findings of the study are given below

First of all, it is observed that North-Eastern States of India has been one of the major silk producing regions of India. Though the region contributed 16.44 per cent to total silk production of India in 1951-52, its contribution continuously declined and reached to 9.17 per cent in 2005-06 in spite of increase in absolute production in the region. It has been due to the faster growth in the production of silk in other parts of India.

Muga and eri are the two major varieties of silk produced in North-East India especially in Assam. Though mulberry is the major silk item of India, its production in the North-East India is negligible and that also has been declining since 1951-52. Tasar silk culture is also relatively new to this region and the region has always been contributing less than one per cent of the total production of India.

Assam ranked first in the production of muga and eri raw silk among all the North-Eastern states. In case of mulberry raw silk, although Assam stood first in the earlier years, it was relegated to the second position by Manipur in the year 1985-86 and since then stayed in the same position. Similarly in case of tasar raw silk Manipur ranks the top most position among all the North-Eastern States.

Record shows that the contribution of sericulture to the total workforce of Assam is not very significant. In the year 1991, sericulture contributed only 6.93 per cent to total workforce of Assam, which even declined to 5.44 per cent in 2001. But within sericulture, ericulture alone contributed 4.55 per cent to total workforce in 1991, which was 65.65 per cent of total sericulture. It is the highest among all the sericulture activities in Assam followed by muga and mulberry culture. Like other ventures of sericulture, contribution of ericulture to workforce also declined in 2001.
It was due to the rapid growth of other sectors, especially the tertiary sector of the economy. But one point is to be noted here that this figure of employment does not include the employment generated in the spinning and weaving of silk fabrics. Therefore, the total figure of employment generated due to the whole ericulture (including endi-textile activities) is much more than the figure supplied by the Directorate of Sericulture, Government of Assam. This is clear from the estimated figure of employment generation per kilogram of cocoon in the sample areas of Barpeta district (Chapter-4), which shows that the total employment generated in all such activities was around seven times to that of man-days generated in ericulture proper. But the whole produced cocoon in the region is not processed for weaving of cloths. About one third of the produced cocoon is used for spinning and weaving (observed from the sample) and if the whole produced cocoon is used for spinning and weaving, there is a great potential to generate further employment in it.

So far income generation is concerned; the contribution of eri cut cocoon to NSDP of Assam at market price during 1980-81 to 2004-05 is also not very significant. It is even less than one per cent. However, its contribution increased marginally during 1980-81 to 2004-05, which was mainly due to increase in production and price of eri cocoon. In case of family income, it is noticed that the average contribution of ericulture to the family income of the sample households was only 3.39 per cent. But whatever be the income generated from this occupation, it fairly supplements income of the rural poor rearers especially the tribal women in a significant way.

Though only about Rs.290 gross income is generated from one Kg of cocoon production in ericulture proper it increased to about Rs.1511 if that cocoon is converted into fabric by the rearers themselves. Therefore, if one-third of the
produced cocoon is processed (as observed from the sample) total revenue generated by the rearers and weavers' families of Assam would not be too small. Moreover, if the processing and weaving of the entire produced cocoon is done by the rearers, there is huge potential for the upliftment of the economic conditions of the ericulturists.

Families employed per kilogram of eri cocoon production and per hectare of land under host plant have declined in Assam during 1990-91 to 2004-05. Similarly, output of eri cut cocoon per hectare of land under host plant is observed to decline with the rise in area under host plant per family during the same period. Conversely, output of cocoon per unit of land with respect to families per unit of land has increased during the period. This is in conformity with the neo-classical law of diminishing marginal productivity.

In the district of Barpeta, ericulture has been the major source of employment among all the sericulture activities. It is mainly concentrated among the Bodo people in the northern part of the district. However, correlation between the annual number of broods reared and the annual family income of the sample households during 2005-06 is observed to be negative. Similarly, the correlation between the revenue generated annually from ericulture proper and the annual family income is also found to be significantly negative. It indicates that relatively poorer are more interested in practising ericulture than the relatively well off families as they have alternative opportunities. The rearers prefer to practice ericulture in winter to summer seasons because of the availability of castor leaves, which is much more during winter than summer and hence collection of it is easier in winter season.

Income earned by the rearers in ericulture proper consists of two important parts, viz. income from eri cut cocoons and income from pupae. Eri cut cocoons are the prime products while eri pupae are the subsidiary product of ericulture proper.
Major portion of income originated from ericulture of the sample families (around 72 per cent) was earned from cut cocoons. Of course, the rearers earned around 28 per cent of their ericultural income from subsidiary product, pupae. In some cases however from the sale of pupae people can earn substantial income. Moreover, pupae are a delicacy dish of the tribal people.

Endi textile is still in the form of a cottage industry in Assam. Earlier hand-spun eri yarn was only valued for man’s wraps and women’s scarves either for home consumption or for gift. But now the trend has changed. Some of the weavers are trying to meet the needs of present generation through variation of products. The product ranges from ladies garments *Mekhela Chaddar, Dokhanas*, skirts, midis, maxis to children and gents garments like jackets, *kurta*; fashion accessories like ties, scarves, stoles, kerchiefs etc and bags, wallets, file folders, portfolios etc.

Although, a number of spinning devices are there, the poor spinners prefer to use traditional Takli. However, the productivity of Takli is very less compared to modern spinning devices. Out of all sample eri-rearing families, 43 per cent were found to be engaged in spinning activity. It is also found that though many families grow eri-cocoon, percentage of rearing families practice spinning and weaving across the villages rises with relatively higher average family income. It is found that, only about 33 per cent of produced cocoons were used for spinning by the sample families. On an average, approximately 800 grams of yarn was obtained from one kilogram of eri cut cocoons. Also, it appears that from spinning of one-kilogram of eri cut cocoon, 17.95 equivalent man-days were generated. On an average, one spinner earns gross revenue of Rs. 804.16 and net revenue of Rs. 594.90 by spinning one kilogram of eri cocoons.
In Assam, usually throw shuttle loom is prevalent in weaving of eri fabrics by the weavers. Eri weavers of Assam prepare two special types of shawl suitable for male and female in winter respectively. On an average, 0.785 man-days were generated in the weaving of a shawl. Average revenue obtained from one male and female shawl was Rs.1340.88 and Rs.599.25 respectively.

From the analysis, it is observed that the ericulture activities have helped 5.2 per cent of the sample families to overcome poverty. Moreover, about 14 per cent of the families have been able to improve their condition from very poor to moderate poor due to the ericulture activities. However the impact on poverty is more in the village where relatively less families practise spinning and weaving along with the production of cocoon. The correlation between percentage reduction in poverty and percentage of ericulturist families engaged in weaving across the sample villages is negative which indicates that the relatively well off families practice weaving along with ericulture proper and hence the impact in terms of poverty alleviation is appeared to be insignificant there.

Growth of ericulture in Assam has been subject to wide spatio-temporal variation. Karbi-Anglong, Kokrajhar and N. C. Hills are among the top five eri cocoon producing districts and Hailakandi and Karimganj are the two bottom districts in terms of percentage contribution throughout the period since 1991-92. It is also found that the advanced districts that were contributing more to state total production in the earlier years are still contributing more. On the other hand, those who were contributing less in 1991-92 are still contributing less to total state production. However, the inter-district variation in contribution to total state production and its growth in different sub-periods have declined, which indicates that the laggard districts have been advancing at faster rate in terms of expansion of eri activities and
output than the relatively advanced districts. The inter-district variation is observed to be associated with the variation in per capita income (inverse but not very significant) and percentage of tribal population (positively) who focus more on eri activities than the other groups though all sections are found to be engaged in it.

It is also observed that the districts like Karbi Anglong, N. Lakhimpur who was among the top five districts in terms of generating employment in ericulture in Assam during 1995-96 was still at the top in 2005-06. Similarly, the districts like Hailakandi, Karimganj, Goalpara, and Bongigoan were among the bottom five districts in terms of contribution to state total employment through ericulture during the same period of time. Unlike production, the gap between contribution of top five and bottom five districts to total family employment in ericulture has increased during the period.

It is noticed that the district of Kamrup ranked first in terms of contribution to state total land under eri host plant in 1993-94 and followed by Karbi Anglong and Sibsagar. Conversely, Bongaigaon, Karimganj and Dibrugarh were at the bottom three positions in terms of contribution to state total ericultural land respectively. In the subsequent years 1998-99, 2002-03 and 2005-06, the share of Karbi Anglong to state total ericultural land was the highest, which is also the largest district in terms of area. In terms of share to ericultural area of the state though ranking has not changed much in the subsequent years, significant changes in ranking in terms of proportion of area of the district used for ericulture have been observed over the years. Goalpara, Morigaon and N. Lakhimpur have recorded leading positions in terms of allocation of area for raising eri feed plants. Moreover, the growth in proportion of area allotted for this purpose is much higher in the districts of Bongaigaon, N. Lakhimpur and Darrang.
than the others as observed from the significant rise in their ranking. However, majority of the districts maintained their relative ranking over the years.

It is observed that production of eri cocoon per hectare of land under eri host plant has declined in most of the districts during 1993-94 to 2005-06. It indicates that the growth followed law of diminishing returns to land under eri host plant. However, some districts like Marigoan, Barpeta have recorded persistent rise in production of eri cocoon per hectare during the same period, which indicates operation of increasing returns from land.

From the analysis it is found that annual average exponential rate of growth of eri raw silk production during 1980-81 to 2004-05 was the highest among all the natural silk, while it was negative in case of mulberry and tasar silk. Similarly, in terms of contribution to workforce ericulture occupies the prime position among all sericulture activities both in 1991 and 2001. In the year 2001, unlike ericulture the number of people engaged in both muga and mulberry culture declined. Consequently, percentage contribution of both to workforce also declined drastically in 2001. Among eri, muga and mulberry culture, the annual average exponential rate of growth of families engaged is the highest in muga-culture, which was about 8 per cent and followed by eri and mulberry culture with 1.92 and 1.28 per cent respectively during 1990-91 to 2005-06.

Initially, muga raw silk was at the top position in terms of absolute value of output and proportional contribution to NSDP at market prices of Assam among all the varieties of sericulture. But after 1987-88, it was relegated to 2nd position by eri whose production and price both grew at faster rate than that of muga. Among the three major sericulture activities, the contribution of mulberry raw silk to NSDP at
market price is the lowest. It was due to both slow growth of production of mulberry raw silk as well as its price.

It is observed that eri and muga raw silk production per family has increased continuously during 1990-91 to 2004-05. Production of muga has increased significantly in spite of marginal increase in number of families practising muga-culture during the period. It is due to the fact that the existing families have been culturing muga extensively as area under each family and hence availability of host plant has increased during that period. In case of mulberry, though production of silk per family has increased marginally during 1990-91 to 1995-96, it declined thereafter in 2004-05. During the period production per eri rearing family has increased at much faster rate than that of muga. However, production of all the three varieties of raw silk per hectare of land under host plant has declined significantly during 1990-91 to 2004-05. It means that though land under host plant per family has increased significantly, the increased area have not been used intensively by the associated families. It is observed that area per family in case of mulberry has increased at much higher rate and its output per hectare has also declined at a faster rate i.e., there is a significant inverse relationship between increase in area under host plant per family and the output per hectare.

It is observed that gross profit and net profit per kilogram of cocoon production is the highest in case of eri, which is followed by muga and mulberry. Whereas average explicit cost per kg of cocoon is the highest in muga, followed by mulberry and eri, and average implicit labour cost is the highest in eri, followed by mulberry and muga. Eri is the most labour intensive among those three but highest yielding and hence it is practised by most of the rural families here. Though net profit per Kg of
It is observed that capital output ratio is the highest in the production of muga cocoon and lowest in case of mulberry. On the other hand, labour output ratio is the highest in the eri and lowest in mulberry culture and there is no payment for the hired labourer as it is done mainly by the family labourer. Capital-labour ratio is also very high in case of muga and followed by mulberry and eri. Even though net profit per unit of investment is much higher in case of muga, people prefer ericulture as gross revenue and profit is significantly higher in ericulture compared to the other two (implicit wage also remains at home) and for that comparatively very low initial investment is required. Also, male labour is essential in mugaculture as it is an outdoor practice. But ericulture as well as mulberry-culture can easily be carried out by the women members of the family.

Age-old ericulture sector has been suffering from a number of economic and non-economic problems. The non-economic problems faced by the ericulture are lack of education in the rearing families and lower status given to the ericulturists by the society. In addition to that the economic problems faced by this sector are the lack of healthy seeds, shortage of feeds to silkworms, marketing problems and lack of financial and other capital. Similarly, endi textile industries of Assam are confronted with a number of economic and non-economic problems. The economic problems are lack of technological improvement and training, marketing problems and financial problems. The economic problems are more serious than non-economic ones.

Majority of rearers and weavers in Assam, particularly in the district of Barpeta depend on their own financial capabilities. Around 85 per cent of the sample families depend on their self-finance at the existing level. Next source of finance is
found to be their relatives who provides loan to about 4.44 per cent of the rearers and
lastly 3.89 per cent of the rearers are found to take advance from the village mahajan.
Role of government is very limited in promoting ericulture in Assam. Although
government has provided financial assistance to the eri rearers in the 10\textsuperscript{th} plan under
Catalytic Development Project (CDP), Tribal Sub Plan (TSP), Scheduled Caste
Component Plan (SCCP) and Grant in Aid to General, those are not sufficient in
comparison to the total number of rearers and their requirements.

In spite of several limitations, from the analysis of cost and revenue functions
estimated from the collected data it is observed that there is ample scope for
increasing ericulture activities in Assam that may help them reducing average
production cost sufficiently and maximise their profit even at the existing level of
technology. Not only that, if those problems are reduced and technological innovation
is possible then it would help further expansion of this culture.

9.3. Conclusions and Policy Implications

Although ericulture has been a practice of rural Assamese women especially
the tribal since time immemorial, it has not flourished sufficiently and at the same
time, people has not left it. It is still practised by the traditional method, as it was
earlier. From the forgoing analysis and observations, the following conclusions and
recommendations can be made for the overall development of the ericulture in Assam.

Deficiency of eri feed plants is one of the important limitations for the growth
of ericulture. The rearers can be encouraged to cultivate feed plants as it is observed
that even if castor is cultivated scientifically, there is still sufficient profit in the
culture. Moreover, the Government should establish more Eri Concentration Centres
(ECCs) and expand the existing ECCs in collaboration with the department of social
forestry and encourage private entrepreneurs to establish ericulture farm. At the same time, indiscriminate cutting down of naturally grown silkworms’ food plants should be prevented by strictly enforcing the existing law. Moreover, to meet the shortage of silkworms’ food plants and to increase production of cocoons, the state government may acquire wasteland and allot the same to the local silk rearing Co-operatives, Self-Help Groups (if any) or diligent rearers for the growth of silk production. Extensive plantation of secondary feed plant like Borkesseru, Tapioca etc, can also be encouraged to meet the deficiency of food leaves for eri silkworms during the crisis of castor.

Government Eri Seed Grainages should be strengthened to produce more Disease Free Laying (DFLs). At the same time, certificates should be issued by the government to the private DFLs producers to meet the increasing demand.

Regulated Cocoon Markets should be established and certified rearers; spinners, weavers and government agencies should be allowed to participate in the auction of cocoon as well as final products. Transaction of cocoons outside the market should be controlled. Some Cocoon Collection Centres (CCC) may be opened in important silk rearing places, especially in the remote areas to save the rearers in the remote areas from the exploitation of middlemen and that will certainly help them to get respectable price. However, the CCC may be authorised to sale cocoon to the poor cum traditional spinners and weavers at reasonable rate so that they will also not be exploited by the middlemen.

Use of modern spinning devices like CSTRI pedal cum motor operated machine should be made popular among the spinners. Necessary training and financial aid along with provision of electricity at a low tariff should be given to the spinners. It will undoubtedly increase the productivity and income of the spinners.
Traditional throw shuttle looms should be replaced, wherever possible, by power or semi-power looms. This substitution will increase labour productivity as well as income of the weavers and other people associated with it. For all these, adequate provisions may be arranged so that the poor rearers and weavers can acquire such instruments and enhance their productivity.

The weavers should be motivated and trained to produce fabrics to meet the taste and preference of the modern generation. Moreover, attempt should be made to blend eri with man-made yarn like polyester to reduce the cost, which will help the industry to expand its market size. For this, market research also should be conducted in order to assess the demand for the silk fabrics and its type. Proper steps should be taken to diversify the products and the selected fabrics/garments of fine grade should be displayed in national and international fairs and exhibitions for promotion of its sales.

No industry can prosper unless it is backed by research and extension services. Therefore, research and extension services of the ericulture should be expanded. The wide gap between the research institutions and rearers should be reduced and laboratory results should be brought to the rearers. The government may also take required steps to include sericulture course in the syllabus at the Higher Secondary and College level as an elective subject with provision for necessary facilities. This process would motivate the increasing educated youth towards this occupation.

To eliminate the financial problem of the rearers and weavers, the state government may persuade the commercial banks and other institutional sources to advance credit to ericulture and weaving sector at a low or subsidised rate of interest. Since the pecuniary plight of most of the rearers is deplorable with little agricultural land, they should be given credit without asking for mortgage. Moreover, steps should
be taken to reduce the misappropriation of government grants to promote ericulture. To remove the problem of capital, SHGs and Co-operatives may be formed among the rearers and weavers which will help them getting loans easily and that will also raise their bargaining power in selling cocoons and fabrics in the market. Moreover, it will help them to receive financial assistance from the sericulture department of the state government and technical assistance as well as other types of aid.

The information gap between the Government and the rearers as well as weavers, as regards sources of finance, availability of modern technology, market etc should be bridged by a network of publications, radio, television, public meeting etc. This will in turn, help emergence of entrepreneurs from the new generation. For that purpose also responsible officers with proper technical knowledge and managerial ability may be appointed to integrate production, marketing and other development activities in relation to silk weaving.

From the overall analysis it can be safely argued that there is a good prospect for the development of ericulture activities in Assam that may provide larger scope for the generation of employment and income in the rural areas and also thereby help alleviating poverty. For the adequate progress of it necessary arrangements are to be there for the removal of the limitations faced by this sector. Steps taken by the government so far is found to be not much productive and there is also the lack of persistent cooperation. Finally co-operation of various sections like officers, artisans, traders, rearers, weavers etc engaged in activities related to eri silk industry is necessary for the successful growth of the sector.