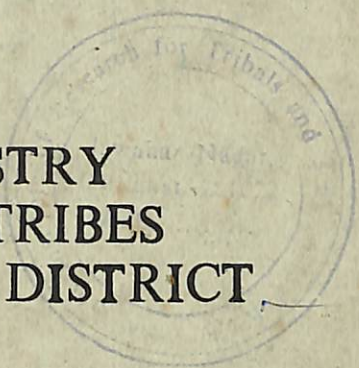


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REPORT ON
THE SURVEY OF
THE SERICULTURE INDUSTRY
AMONG THE SCHEDULED TRIBES
COMMUNITIES OF KOKRAJHAR DISTRICT
OF ASSAM



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P R E F A C E

Sericulture is an important cottage industry in the rural Assam. Among the tribal communities of Assam, inhabiting hills and plains, this is rather an important household industry contributing a substantial portion of the family income. However, the most common form of sericulture industry in Assam is the rearing of Endi, spinning of Endi yarn and weaving of Endi clothes. Mulberry silk is also reared by tribal families in some particular areas only and the number of such families is not so high. Muga from which golden silk is produced is another variety of silk worm. But the number of families practising the rearing of Muga is very much limited since the Muga worms cannot be reared within the four walls of a house and rearing the worms outside is also very laborious since 24 hours vigil is essential.

The Kokrajhar District of Assam has the highest concentration of tribal population and as per 1971 Census the tribal population of Kokrajhar constitutes 23'66% of the total population of the District. The Tribal Research Institute, Assam, was instructed by the Ministry of Welfare, Government of India, to conduct a survey of the sericulture industry among the scheduled tribe communities in one of the districts of Assam. Basing on the highest tribal population concentration and ^{also the} number of families engaged in sericulture industry, we have selected the Kokrajhar District for the purpose of our survey. Shri Mrigen Das, District Research Officer, Guwahati, was entrusted to conduct the survey under the over all guidance of the Director of the Institute. There are about 170 tribal villages in the district of Kokrajhar where sericulture plays an important role as a subsidiary occupation. 10% of the villages were selected on random sampling for the purposes of our survey. It was ascertained from the officials of the Sericulture Department that about 850 families in these villages have taken up sericulture specially the rearing of Endi silk worms as a secondary source of their livelihood. 10 per cent of these families were taken up for study on the basis of random sampling. The field work was completed within a span of about one year from April'87 to April'88. Due to some practical difficulties beyond our control the report writing was considerably delayed.

Now the data collected from the field survey are presented in a report form. In this report in the Introductory Chapter a basic idea regarding the sericulture industry is given. Next the schemes taken up for development of sericulture in the Kokrajhar District have been described. In the third part of this report the data collected from the 85 tribal families are analysed pointing out the salient features. A few case studies on individual rearer families are also presented to examine whether the benefits received from the department have any impact on the economic conditions of the rearers. The main findings are incorporated in the concluding observations towards the latter part of the report.

This report has thrown some new lights in regard to the resource potentialities of this industry and its possibility as an income generating scheme specially for those tribal families who are yet to come above the poverty line.

It is expected that this report will be helpful to those officers of the development departments specially of the Department of Sericulture, who are engaged in the development and upliftment of the tribal people of Assam.

Dated Guwahati
the 31st March, 1989

(B.N. Bordoloi)
Director
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A SURVEY
OF THE SERICULTURE INDUSTRY AMONG THE SCHEDULED TRIBE
COMMUNITIES OF THE KOKRAJHAR DISTRICT
OF ASSAM

CHAPTER - I

INTRODUCTION

Sericulture is an important agro-based cottage industry in Assam. It plays a significant role in building up the infrastructure of rural economy. Moreover it is intimately connected with the socio-cultural life of the people. This industry has been in existence in Assam since time immemorial. Eri, Muga and Pat are the three varieties of Assam silk. Congenial climate and fertile soil have rendered possible for thriving of various silk worms as well as their food plants. Due to availability of wild oak tassar plants, tassar rearing has also been taken up recently in the autonomous districts of Karbi Anglong and N.C.Hills. Assam has achieved a remarkable position in the sericultural map of the world for eri and muga silk industry. It may be mentioned here that muga, the gold^m silk, is found nowhere except in Assam.

'The art of sericulture, and the rearing of cocoons for the manufacture of various silk cloths, were known to the Assamese as early as the Ramayana and the Arthasastra. The former mentions Magadha, Anga, Pundra and the 'country of the cocoon rearers', : (kosa-karanam bhumih), which was no other than Kamrupa, lying to the east of Pundra. The classical writers, beginning atleast with the 1st century A.D., make important mention of the production of silk and the silk trade in and through Assam. The Periplus refers to both raw and manufactured silk, which were from Thina or Assam.

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Philostratus gives a description of the people of Seres who were noted for silk, which their forests produced..... Dionysius mentions people, similar to the Sesatae of the Periplus, of Assam, and he refers to the tassar or muga silk of Assam, which was variously dyed. Ammianus Marcellinus, describing the people of Seres, mentions silk under the name of sericum, and the people are said to have been expert in the production of silk, which was exported to different countries. Schoff, on the basis of the Periplus, contends that the silk industry originated in China and travelled from there to Assam and other parts of India. In the opinion of Watt, it originated in Manipur in Assam. He also adds that this place 'was the home of the silkworm - that the real mulberry silk insect originated in Manipur and went from there into China.' Silk was, however, known in China as early as the Shang Period, (1523-1027 B.C). It is difficult to fix a date for the knowledge of silk industry in Assam, but it was known at least as early as the period of the Arthashastra and the Ramayana, if not earlier. As the industry was mainly confined in the past to the Tibeto-Burman elements in Assam, it is not unlikely that along with their migration to Assam they introduced some ideas from China; but the manufacture of muga silk has been confined to Assam alone, and this land, like China, had a world wide reputation in the manufacture of varieties of silk cloths, and had a profitable foreign trade in such articles.' 1

The present study is confined to the district of Kokrajhar only. That is why, it is considered

1. The History of Civilisation of the people of Assam to the Twelfth Century A.D.-P.C.Choudhury- P.339.

necessary to have a glimpse of the land and people of this district. The district of Kokrajhar lies between latitudes 25.28° and 25.30° N and longitudes 89.42° and 90.06° E with a total geographical area of 4717 sq.km. Previously it was a subdivision of the erstwhile Goalpara district which was fragmented into three districts viz. Goalpara, Dhubri and Kokrajhar in the year 1983. The district is bounded on the north by the mountainous region of Bhutan, on the east by Barpeta district, on the west by the State of West Bengal and on the south by the districts of Goalpara and Dhubri, Physically almost the entire district is plain with gradual slopping from the north to south. Although the mighty river Brahmaputra flows through the districts of Dhubri and Goalpara, even then the whole of the natural drainage of the district ultimately finds into it. Other rivers of the district are the Aie, Champawati, Sarabhanga Manas and Sankosh. One of the important features of the rivers is that most of them are shallow and during rainy season the rivers are in high spate with rapid current. The river Aie which becomes most turbulent during the monsoon season is termed as river of sorrow of the Kokrajhar district. Every year this river during rainy season changes its course and causes immense damage to the standing crops. Due to dearth of adequate geological data we are not in a position to deal with the geology of the district. However, it may be stated that the solid geology of the district is covered by alluvium. The older alluvium stretches from the Bhutan border to the 250 feet contour level southward. Rocks belonging to the Tipam series are exposed along the Bhutan border between the Rekhajuli and the Kanamakra rivers. The plain is dotted with hillocks consisting of metamorphic

rocks. The soil is fertile and it is composed of sand and clay in varying proportions. The district experiences both hot and wet climate during the year. The winter season starts from the later part of November. The average daily maximum temperature during this month varies from 24.5 C to 29.9 C. The coldest months of the year are December and January. From the month of March the temperature begins to rise and the highest temperature occurs during the months of July and August when the maximum daily temperature varies from 37.7 C to 40 C. With the advent of spring season the S.W. monsoon makes its maiden appearance in the month of April with some occasional showers. Heavy rainfall is experienced by the district from May to September. On the other hand, rainfall decreases from the month of October and from December to March there is hardly any rainfall.

According to 1971 Census Report the total population of the Kokrajhar district is 7,10,066 which is 4.8% of the total population of the State of Assam. The number of scheduled tribe population in the district is found to be 2,03,547 which constitutes 12.67% of the total tribal population of the State. On the other hand, the scheduled caste population of the district is 34,870 which is 3.82% of the total scheduled caste population of Assam. The scheduled tribe population of the district constitutes 28.6% of the total population of the district. Again, among the tribal communities inhabiting the district, the Bodo Kacharis occupy the predominant position i.e. 95.4% of the total scheduled tribe population of the district. The estimated population of the district in the year 1986 is 10,90,000.

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The percentage of literacy in the district as per 1971 Census is found to be 21.3 against 28% of literacy in Assam. Again the percentages of literacy in both male and female of the district are 29.8 and 12 respectively while we find the percentage of male and female literacy in Assam to be 37 and 19 respectively.

We have mentioned earlier that among the tribal communities in the Kokrajhar district the concentration of the Bodo Kacharis is the highest. Keeping this view in mind, our study is also directed towards having an insight into the sericulture industry carried out by the people belonging to this tribal community. But before going into details about the sericultural activities, let us have a peep into the life and culture of the Bodo Kacharis.

Bodo Kacharis

The Bodo Kacharis belong to the great Indo-Mongoloid (Kiratas) Group who entered into Assam through the north eastern passes. The Mongoloid features like projecting cheek bones, straight hair, scanty beard, flat nose, slit eyes etc. are prominent in their appearance. Linguistically they belong to the Assam-Burma group of the Tibeto-Burman branch of Sino-Tibetan speech family.

The origin of the word Kachari is difficult to trace. Different versions have been adduced as regard to the origin of the word. According to Sir Herbert Risely, one of the two progenitors of the human race settled in the tract at the foot of the hills between the Brahmaputra and the Kosi river, called

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Kachar by the Nepalese and his descendants were Mech, Koch and Dhima tribes. If Kachar was an early home, then they may well be called Khacharis or Kacharis. But according to E.A.Gait, the word Khachar is derived from Sanskrit which means 'broadening region'. The district of Cachar might have been named from this word or might have been so called after its great tribe, the Kacharis. But Gait opines that Kacharis did not get their name from Cachar as they were known by that name in other parts far removed from Cachar. According to B.K.Barma the word is 'connected with Sanskrit Kaksata a hypothetical formation paralleled to Sanskrit Kirata'.²

Generally the Bodo Kacharis construct their house on ground with bamboo, wood, thatch and cane etc. There are definite regulations as to their house building and maintenance of their homestead. The main house stretches from the west to the east. There are three divisions of the main house with the provision of a door facing to the south. The easternmost portion of the main house is used for cooking and worship. The courtyard also provides the altar of Bathow, the Supreme God, with a Sizu tree as the emblem. The Sizu tree is on the north-eastern corner of the courtyard parallel to the easternmost portion of the main house.³

2. Gazetteer of India, Assam State (U.M. & N.C. Hills district) p. 79.

3. Boro Kacharir Samaj Aru Sanskriti, Bhaben Narzi p. 010

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The village council constituted by the Bodo Kachari village is headed generally by the Gaonbura. All matters relating to the village affairs are discussed in the council. The 'Halmazi' who is appointed by the village council is to disseminate the information to the village people about the date and time fixed for various discussions in the council. Moreover he is entrusted with the job of receiving public guests or Government officials. A 'Deori' is selected from the elderly persons of the village in order to preside over the socio-religious functions and to conduct atonement proceedings (Uddhar Prachitta).

The spirit of co-operation among the Bodo Kacharis is highly significant, 'Sanguri' and 'Gatha' are the two systems through which they exhibit their attitude towards co-operation. A man who is not in a position to perform a major work alone, may approach the village people for 'Sanguri' or helping hand. People came forward and finish the work. The man entertains them with meal, ricebeer etc. On the other hand 'Gatha' is a system through which a work is performed by a group of persons by rotation to the mutual advantage of all the members of the group concerned.

Of late, we find two sections among the Bodo Kacharis- the Brahmas and the traditional Bodos. The Brahmas are those who practise Vedic rituals and perform socio-religious rites including marriage ceremonies through 'Hom- Yagna' following the tenets preached by Guru Kalicharan Brahma. On the other hand the traditional faiths and they perform their marriage ceremonies through the 'Hatha Chuni' system. (Hatha means the wooden table spoon by which the bride distributes rice).

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Monogamy is the usual practice junior levirate and junior sororate may also take place. Widow marriage is permitted. The social structure of the Bodo Kacharis is primarily patriarchal with a few matriarchal traits.

Agriculture is the main source of livelihood of the Bodo Kacharis. They practise both Ahu and Sali paddy cultivation. Moreover they cultivate potato, mustard, pulses, cotton, maize and banana etc. The surplus product is sold in the local market. In order to derive financial benefit they also rear pigs, fowls and goats etc. The women are expert in the art of weaving Endi and Silk clothes and embroidery. In addition to their household duties the women extend helping hand to the menfolk in agricultural activities. Rice is the staple food. Leafy vegetables and edible roots are included in their daily menu. Fish is their delicacy. Ricebeer is the favourite drink. Drinking also occupies a significant portion in the social life of the people.

'Baisagu' or the spring time festival is the most important festival of the Bodo Kacharis. 'The institution of 'Kherai' - a religious annual community festival of the tribe is another occasion when the entire atmosphere is agog with much enthusiasm and festive fervour. To some it is a national festival of the community. It is intended to propitiate 'Bathow' or 'Sibrai' - the chief deity of adoration of the Bodo Kacharis alongwith 'Mainao' (the Goddess of harvests) and host of other Gods and Goddess.

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'Bathow' according to them represents the five basic elements called 'Panchabhut' (viz. earth, air, water, ether and fire) out of which has emerged the human body and for that matter the entire universe and the propitiation to this deity, is, therefore, held to be on this basic philosophical idea.'⁴

The Bodo Kacharis dispose of the dead body either by cremation or by burial. Dasa or Dahar takes place on the 10th day while Shradha ceremony is held on the 12/13th day or at a later date as per convenience of the household.

Methodology of the Study :

Within the jurisdiction of the Kokrajhar district there are about 172 Nos of tribal villages connected with sericultural activities, as per information collected from the office of the Assistant Director of Sericulture, Kokrajhar. We have, therefore, selected for our study 17 nos. of villages (10%) on the basis of random sampling covering both the subdivisions of Kokrajhar and Gossaigaon.

Villages selected from the Kokrajhar subdivision are :

4. Tribes of Assam, Pt.I - Tribal Research Institute, Popular Series, P.9.

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- | | |
|--------------------|--------------------|
| 1. Basor gaon | 6. Thilapara |
| 2. Bathabari | 7. Adabari |
| 3. Choto Gonderbil | 8. Belguri |
| 4. Narabari | 9. Baramolamdubi |
| 5. Bhatipara | 10. Boro Gonderbil |

On the other hand, villages selected from the Gossaigaon subdivision are :

- | | |
|-------------------|--------------|
| 1. Moinatula | 5. Bhumka |
| 2. Guabari | 6. Aminkata |
| 3. Balimari Pt.II | 7. Balamguri |
| 4. Bijoynagar | |

It may be mentioned here that Government schemes in relation to sericulture have been collected from the office of the Assistant Director of Sericulture, Kokrajhar and also from the Superintendent of Sericulture, Gossaigaon. The selection of beneficiary is carried out by random sampling method. Interview schedules were prepared for conducting the study. All the heads of the households engaged in sericultural activities (85 nos) were contacted personally for the interview.

CHAPTER - II

FOOD PLANTS OF SILKWORMS, LIFE CYCLE OF MULBERRY SILK WORM AND TECHNIQUES OF PRODUCTION

Sericulture industry constitutes the culture of Eri, Muga and Mulberry silk worms. Eri, the yellow-coloured worm silk is obtained from the Eri silk worms (*Attacus ricini*) which are usually fed on castor oil plants (*Ricinus communis*), called 'Era' in Assamese. Substitute food plants for the Eri worms are keseru

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(*Hdtero panax fragrans*), tapioca (*Manihot x utilis-sima*), gulancha (*Jatropha cureas*), Gomari (*Gamelina arborea*) and Bogri (*Zizyphus jujuba*) etc. On the other hand, Muga, the gold coloured silk, is derived by means of rearing muga silk worms (*Antheraea Assama*) on som (*Machilus Bombycina*) and sualu (*Litsaea Polyantha*) plants. Other food plants suitable for muga worms are Mejankari (*Litsaea citrata*), Dighlati (*Litsaea selicifolia*) and Chapa (*Machelia oblonga*) etc. Pat or mulberry silk is available from mulberry silk worms (*Bombyxmori*) which subsist on the leaves of mulberry (*Morusalba*) plants, locally known as 'Nuni'.

Instead of presenting the life-cycle of the three varieties of silk worms we have made an attempt to throw some light on the life-cycle of the mulberry silk worm only and in doing so, we have taken the liberty of reproducing the description, omitting some lines here and there, from the book written by Dr.S.N. Choudhury who is an authority on the silk worm physiology and genetics.

(i) EGG

The silk worm's life is cyclic. Each cycle takes about 60 days to complete from egg back to egg. Its life begins as an egg. The egg is laid after the mother moth is fertilized. The egg is oval, tiny as the head of a pin, slightly yellow in appearance, smooth and plain. The egg has a hard shell

5. Silk worm and Its Culture, Dr.S.N.Choudhury, P.8.

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of chitinous material which is full of yolk-nourishment for the future embryos. The eggs are pasted methodically in place by the mother moth with an adhesive substance secreted by a special gland. In some races this substance is lacking. The size, weight and colour may vary according to various races. The average number of eggs laid by a moth may be 500, with variations in individuals. All these eggs are laid within a time interval of about 24 hours. Preservation of eggs at normal room temperature with necessary humidity results in the hatching after ~~10~~ 10 - 12 days in the indigenous many-brooded (multivoltine) races, and after about one year in the single-brooded (univoltine) ones with a resting period of 3 months.

(ii) L A R V A

The tiny hairy baby that comes out of the egg shell is about 3 mm or less in length and has the thickness of a hair. The head is relatively big. The body is greyish brown in appearance with numerous hairs. It changes its skin colour slowly to white with the passing of instars by the deposition of granules of uric acid in the skin. Soon, it begins to establish itself as the world's most avid gourmand eating away mulberry leaves, its only food. Incidentally, it is interesting to see that mulberry is perhaps the only plant in the plant kingdom giving the largest quantity of leaves.

The rearing period of the larva requiring about 30-40 days depending on race and season, is a complicated process of the insect's life-cycle. The worm is at first fed with tender and chopped leaves. As larval age advances it is fed with mature leaves.

To eat is the be-all and end-all of the life of the silk worm. Like the familiar legendary character, it stops eating only to fall into a deep slumber and wakes up to resume eating where it left off. After every slumber, the silk worm sloughs off its old skin from its body as if the tight fitting garment is removed and takes 24 hours to do it. The skin is changed 4 times in its career and the number is variable. The larva stops feeding when the silk glands are fully developed which is evidenced by the worm's golden colour and transparency. Eight days or perhaps less, after the last sloughing, spinning is started preliminary to making cocoon.

The head of a larva is a well-differentiated tough capsule, in fact three segments fusing in its formation. The two oval lobes are prominent consisting of a triangular area in the front. The head carries the organs of vision (six pairs of ocelli) and touch (a pair of antennae, a sensory organ), two pairs of maxillary and labial palps, one pair each of lips and maxilla (the latter being receptor or organ of taste and odour of mulberry leaves), two strong mandibles (used to cut the leaf apex befitting to serve the primary mission to eat) and a prominent spinneret (from which the silk is extruded).

The three thoracic segments carry in each a pair of true legs. These thoracic legs composed of three articulations and terminating with a recurved hook serve not only for movement, but also to hold the leaf firmly while it eats. The first two abdominal segments do not bear any appendage, but the following four segments carry a pair of false or pseudo-legs. Two segments following the next segments are devoid of any legs, but the last segment carries a pair of false

eggs. These are of prominent cylindrical shape and retractile. In the majority of races, the silk worm possesses a pair of dark crescent spots on its dorsal side in the sixth segment.

Internally, the body of the larva is extremely complex. Under the skin on the dorsal side of the body, a transparent tube is clearly seen contracting rhythmically. This is the dorsal vessel, a form of elongated heart. The pulsating movement helps the circulation. The blood contains a multitude of colourless globules and in some, it is coloured yellow or green. The colouration of the blood is clearly seen in the abdominal segments. A silkworm containing white blood usually spins a white cocoon, while yellow or green blooded worm spins a cocoon of a corresponding colour. There is also some relation between the colour of the egg yolk and that of the blood. The pigment responsible for the colouration of blood or cocoon comes from the leaf.

The digestive apparatus consists of oesophagus, a voluminous stomach, an intestine and Malpighian tubes having the function of excretion. The nervous system consists mainly of cerebral ganglions, situated in the head and a chain of 12 ganglions which extend along the digestive tube. The organs of reproduction are represented by two small white structures in the male situated between the 8th and 9th segments and a different structure in the female.

(a) Casting of the Skin

The silkworm has a thin cuticle, flexible between the segments and joints. It is impermeable and rigid. The casting of the skin known as moulting, takes place at intervals as the larva outgrows the old cuticle. During this period, the larva does not take any food and

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rests immobile firmly holding by its leg with head upward. Fluctuation of temperature and dry condition during this period seriously affects the health of the larva and may cause death. A moulting fluid secreted by a gland, known as Verson's gland, helps to separate the old cuticle. The old cuticle splits as a result of the expansion of the body and through this split, the insect pushes, drags and frees itself out from its old garment. This period is very critical in the life of the larva. The act of moulting is termed as ecdysis, the period between two moults as instar and the shed cuticle is known as exuvium. The rate of growth per instar is usually constant and the first and last instars are very prominent from the practical point of view. The larva head capsule grows in geometric progression increasing in width at each moult.

(b) Silkgland

Silk dominates the life of the larva. It is actually secreted continuously and is a product of a pair of long complex glands, the second largest organ of the body. Each gland is several times the length of the larva. In a mature larva, the gland occupies two-fifth of its body-weight and volume, situated from the fourth to the eighth segment. The larva spins from the exterior to the interior. It is calculated that the worm turns round 60,000 to 300,000 times inside the cocoon in order to complete it. The silken thread is formed by a worm at an average rate of about 6 inches a minute.

The posterior part of the silkgland is long and narrow, the middle one is long and voluminous sub-divided into three functionally different portions

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and the anterior is narrow. The two anterior parts of the paired gland unite to end in the spinneret near the mouth. A pair of Lyonet's or De Fillipi's glands is situated near the opening, the secretion of which either unites the silk threads or lubricates them.

The silk thread is composed of an inner core of fibroin (silk protein) formed by the posterior part. It is surrounded by an envelope of sericin (a kind of protein) which is formed by the middle part. The silk is secreted as a liquid which hardens immediately upon being extruded. The colour of the sericin corresponds with that of the blood, whereas the fibroin is always white. The silk thread consists of 75.80% of fibroin and 20-25% of sericin.

(c) Cocoon

The cocoon varies in shape according to the race and may be spherical, oval, conical, pointed, waisted or strangulated, and the colour -white, pink, fleshy, golden yellow, yellow, pale green, bright green, etc. The pigment is due to carotinoids or flavones that pass from blood to the silk gland colouring the sericin. Many malformed or irregular cocoons appear due to unsuitable cocoonage. In some races, two worms jointly spin a single cocoon of a bigger dimension. A cocoon with female pupa weighs on an average more than the male, but the latter is richer in silk. The weight and quality of the cocoon depend mainly on the race and the condition of rearing. The oriental races give a finer quality of silk, but this is less elastic and inferior in tenacity than the European ones.

Each cocoon is composed of a single, continuous thread averaging from about 400 to 1500 meters in length. With the emergence of the moth, the continuity

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is broken. For reproduction, separate selected races are retained. Commercial cocoons with high silk content and quality are saved from injury by moths. After about 10 days, the pupal inside are filled by dropping the whole lot into hot water, by steaming, by dry heat or by fumigation. The cocoons are then assorted according to colour and texture. The loose floss is removed. The cocoons are soaked in warm water to soften the gum that binds the silk thread together and skilfully unwound. The threads from several cocoons are wound together on wheels to form the raw silk. After processing of various kinds it is ready for spinning into beautiful fabric.

(iii) PUPA

Finally, the larva, when fully grown, begins to prepare for the moult that will transform it into a pupa or chrysalis, the male maturing earlier. The larva stops eating and seeks a place or crevice in which to pupate. The natural tendency is to go upward to form the cocoon. In a selected place, the spinning is begun, with the larva staying inside and the process is continued till the cocoon becomes thicker and thicker. At last, the silkworm disappears from sight, enclosed deep in the cocoon, a structure possibly necessitating its protection, but a material of valued utility to mankind. The cocoon is completed in 3-4 days.

The naked pupa inside is considered as a highly specialised first-instar moth. In it are found all the necessary essentials of the moth. On its surface, traces of the future moth can be seen in shallow relief; such as, the compound eye, the wings, the antennae, legs, genital appendages, etc.

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The pupa is a complete introvert. Sealed in its impermeable integument, the respiratory activity is carried to the minimum through the spiracles. It takes no food and discharges no wastes. The loss due to evaporation is reduced to the minimum. Wastes of uric acid are accumulated in the hind gut to be discharged by the moth shortly after emergence. The development of the pupa is speeded or retarded more by environmental influence.

(iv) M O T H

After about ten days, the pupa finds its way out of the cocoon to emerge as a moth, the male emerging earlier. During this process, the pupa performs the double task of breaking the pupal and the cocoon shell. This difficult operation is completed by secretion of a strong alkaline solution that dissolves the silk fibre. The delicate, soft, crumpled creature with easily damaged sac-like wings is now in a critical hazard. The adult moves to a position after emergence, where it can hang wing downward. Slowly, all the body structures are hardened. The whole process is completed in a quarter of an hour. Thus the adult life begins.

The moth now possess conspicuous eyes and feathery antennae, that of the male being bigger than the female with enormous sensory areas, the function being organ of smell, receptor of touch and perhaps of sound vibration. The thorax bears three pairs of legs and two pairs of wings with veins that support them. Externally, the abdomen is relatively simple with tufts of hair on it. At the end portion the reproductive openings are prominent. Internally, there are some vital organs-excretory and reproductive.

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The head contains the organs of feeding, sensation and control, the ~~thorax~~ contains organ of locomotion and the abdomen that of generation.

(a) Transformation

One is struck by the conspicuous differences between the larva, and the moth. The former is without eye and wing; but with false legs and potent mandibles. On the other hand, the moth is small and winged; but without mouth and with large eyes. The internal differences are equally remarkable with regards the digestive tube, the nervous system and the reproductive apparatus. During this transformation the most specialised larval structures are built up for imaginal rudiments. The breakdown of larval tissues is known as histolysis, a fact accompanied by actual disintegration and digestion of tissues and partially by the ingestion of dead tissues.

Both moulting and metamorphosis are controlled by the action of the balance of two kinds of hormones secreted by two glands- prothoracic gland and corpora allata, situated near the brain and thorax. The brain controls the secretion of the hormones and in turn is controlled by external stimuli. The hormones are carried by the blood to stimulate the tissues involved in the process. The balance of the secretion of the two hormones at different stages leads to transformation to pupa and moth. Such hormones are known as ecdysone and neotenin or juvenile hormones.

(b) The Moth's Allure

After the emergence, the male moth erratically and frantically searches for the female and is

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attracted from a long distance. The presence of a virgin female is transmitted by a scent, emanated by her scent gland situated at the posterior end. This scent excites a strong emotion in the male. The extraordinary power of the female moths to attract males over long distances is the nature's most baffling phenomenon. Male chinese silkworm moths have been known to home-in on intended females from as far as seven miles. Since a female under a bell jar will stir nothing in males on the outside only inches away, it is concluded that the secret of her charm must be an odour from a substance so strong that a few molecules send males fluttering. It is also interesting to know that the scent is so specific that only males of her species are attracted.

(c) Pairing and Fecundation

The emerged female moth is insensible to all other external stimuli. It is not attracted by light like other moths. Though the wings are well developed it is incapable of flight and gathering nectar. It has no mouth and in fact, no function other than mating. All its movements and reflexes are oriented for reproductive purposes. Thus the amorous life starts immediately after emergence. The male, on the other hand, moves here and there by strongly beating the wings and at last finds the passive female. He folds fast her posterior end, by the strong chitinous hooks. The pairing starts and the beating of wings ceases, continuing occasionally but in a different way. A period of three hours is enough for a successful pairing.

contd..21/-

During the process of copulation, the spermatozoa which is formed already in the pupal stage in the testes finds its way at one point of the female reproductive apparatus. As the egg is laid, sperms enter the egg through the micropyle which may be 1,2,3, or more in number. The inseminated female starts laying after unpairing. The actual fertilization i.e. the union of sperm and egg nuclei takes place two hours after deposition.

Some unfecundated eggs of silkworm may start development without the presence of sperm and such capacity is latent in many races specially the univoltine ones. This is known as parthenogenesis. When artificially treated with warm water the virgin eggs may give rise to viable individuals and the resulting offsprings are all females in character, whereas in the fertilized eggs, the males and the females are equal in number.

In this chapter let us also discuss about the techniques of production viz. rearing of worms and methods of spinning, in a concise way.

Rearing of eri worms :- The cocoons selected for breeding are placed in a bamboo basket (Khaloi, in Assamese) which is kept under suspension after its mouth being wrapped by a piece of cloth. In the summer season, 12 to 15 days are sufficient for the emergence of moths but in the winter season, 20 to 25 days are required. After 24 hours of the emergence of the moths, the females (identified by larger body) are collected and tied to bamboo sticks very carefully so that they do not face any difficulty in mating and laying eggs. It is said that a female produces about

contd..22/-

200 eggs. Only those eggs laid during the first three days are collected and tied in a piece of cloth which is suspended on the wall of the house. In summer, hatching takes place within a week whereas in winter it takes about 15 days. When the larval begin to come out of the eggs, the piece of cloth is opened and placed over a bamboo tray which is hung up in the house with sufficient supply of tender and chopped leaves of the castor plant. The worms begin to grow up. Bunches of mature leaves are suspended and the worms are removed to feed on the leaves. It may be mentioned that moulting i.e. casting of the skin takes place 4 times during the life of the eri worm. In the first stage, it is light blackish in colour and about one-fourth of an inch in length, while in the second stage, orange colour appears and twelve rings are developed in the body. Again, in the third stage, the colour becomes white and in the last stage, it becomes dark green and the worm develops into 3 inches in length. After the attainment of maturity the worms stop eating and climb up to the top of the bunches of leaves. The worms are then placed in a basket which is filled with dry leaves of plantain or mango etc. Now the worms start spinning and they complete the cocoons within 4/5 days. It may also be pointed out that in a year 4 to 5 broods of eri worms are reared by the people.

Rearing of muga worms :- The selected cocoons are put into a closed basket suspended from the roof; the day after they are hatched the female moths are taken out, and tied to small wisps of thatching grass, taken always from that part of the house immediately over the hearth; its darkened colour being thought more

contd..23/-

acceptable to the moth. These wisps are then hung on a string tied across the house, to protect them from rats and lizards, they are taken out morning and evening, and exposed to the rays of the sun. The eggs laid during the first three days, are the only ones considered worth keeping. Ten days after the laying of the eggs, when a few of them are hatched, the wisps of straw to which the moths had been fastened are hung to the trees on which it is intended the caterpillars should feed; and these soon find their way to the leaves. Care must be taken that there be no ants about the trees, for their bite usually proves fatal to the worms in their early stages. Previous to placing the worms on the trees, the natives generally rub the trunk with molasses, and the fish and other things to it to attract the ants, when accumulated in great numbers they destroy them with fire. The ground about the trees must also be kept free from underwood, which renders it easier to find the worms should they happen to fall off. To prevent the worms coming to the ground, fresh plantain leaves are tied round the trunk, over the slippery surface of which they can not crawl. During the day the worms require to be constantly watched, crows and other birds being so fond of them, that they lie in wait for them in the neighbouring trees. Bats, owls and rats are very destructive at nights. A number of caterpillars are also destroyed in the more advanced stages by the sting of wasps, and by the ichneumen insect, which deposits its eggs in their body. The worms thrive best in dry weather; but a very hot sunny day proves fatal to many at the time of moulting. At these periods rain is considered very favourable; thunder storms do not injure them as they do the mulberry worm. Continual heavy rains (which by the way seldom occur) are hurtful by throwing them off the trees; showers, however heavy

Contd..24/-

cause no great damage; the worms generally taking shelter under the leaves with perfect safety. The worms during their moulting remain, on the branches; but when about beginning to spin, they come down the trunk; and the plantain leaves preventing their going further down, they are then collected in baskets, which are afterwards put under branches of dry leaves suspended from the roof of the house: they crawl up into these, and there form their cocoons'.⁶

Rearing of mulberry worms :- The cocoons, selected for the purpose of breeding, are placed over a bamboo tray which is again kept in a specially made bamboo rack with the intention of protecting the cocoons from the possible damage by rats and insects etc. The moths begin to appear within 10 to 20 days depending upon the variation of seasons. For the purpose of mating, both male and female moths are put together in a bamboo tray for about four days. Afterwards, the female moths are collected and placed in a piece of cloth and they start laying eggs. The eggs are deposited in a piece of cloth, placed inside a bamboo basket. Young worms come out of the eggs after few days. These worms are kept over a bamboo tray and tender leaves of mulberry trees are supplied to them. As soon as they grow up, mature leaves are provided to the worms for consumption. The worms having attained maturity within 30 to 40 days, are placed in a bamboo tray consisting of several compartments. It is to be noted that each compartment is

6. A Descriptive Account of Assam, William Robinson, P.229.

contd..25/-

alloted to 2 or 3 worms. Here they start spinning. Within five days, cocoons are completed.

Method of eri spinning :- In order to prepare the cocoons for spinning, first of all, the life of the chrysalis is destroyed by means of exposing the cocoons to the sun or placing them in boiled water. After having finished this primary job, the cocoons are opened to extract the chrysalises. Later on, the cocoons are boiled for 2/3 hours in an alkaline solution which is prepared indigenously with the ashes of certain leaves and straw. The quantity of alkaline ash required is half the weight of the cocoon used. After the bailing is over, the cocoons are wrapped in green plantain leaf for three to four days, as a result of which the inner content of the cocoons becomes loose. Now the cocoons are washed in clean water and then dried.

For the purpose of spinning, drop spindle takli or takura is used by the people. But the spinning through takli is alaborious and time consuming process. Of course, now-a days improved types of Charkha viz. Nidhiram Charkha, Jaipur Charkha, Chowdhury Charkha and Ambar Charkha etc. are available.

Method of muga spinning :- 'The life of the chrysalis having been destroyed by exposure to the sun, or by fire, the cocoons are boiled in an alkaline solution. When required for use, their floss is plucked off, and they are placed in a pot of warm or cold water. Two persons are employed, one to take the silk from the cocoons, the other to reel it. The former brings together the filaments of silk from a number of cocoons, varying from 7 to 20, and hands them off to the reeler, who rubs

contd..26/-

them into a thread by rolling them on his thigh with the palm of his right hand and the underpart of the fore-arm, while with his left hand he turns the fly-wheel of the primitive reeling apparatus ('Bhangori') that stands beside him, an axle turning in the notches of two uprights, with the aforesaid wheel at one end or often merely a cross-stick in the middle to serve the purpose of a fly wheel. In this way the whole of the cocoon can be unwound, except the inner most layer next to the chrysalis.'⁷

At present various types of muga reeling machines are available for use. Mention may be made of Chowdhury type reeling machine, Tribedi or Nihal reeling machine and Ambar type reeling machine etc.

Method of mulberry spinning :- 'The pat thread is sometimes spun, but generally reeled in the same procedure as muga reeling. To make the cocoons ready for reeling, the chrysalises alive inside the cocoons are to be destroyed either by exposing them to the sun or by boiling. As the cocoons have a yellowish tinge, the cocoons are placed in a vessel with water and boiled by adding some amount of potash to it to make the thread white and soft. During the period of boiling, the cocoons are stirred with a bamboo stick and as a result the filaments of the cocoons are attached to the stick. The ends of the filaments thus attached are taken to the reeling machine where the thread is reeled. Spinning of Pat

7. Assam in the Ahom Age, Dr. N.K. Basu, P. 168.

contd..27/-

thread can also be done with any of the following devices, Takli, Das type Charkha, Joypur Charkha.'⁸

It may not be out of place to mention here various diseases which are of protozoan, bacterial, virus or fungal nature, in eri, muga and mulberry silkworms. If precautionary measures are not adopted in time, total elimination of a brood may take place. Flacherie is a disease caused by virus followed by secondary infection of bacteria. It occurs when the larvae are fed on the leaves of different plants, resulting indigestion of the larvae. The disease may also occur due to over crowding of larvae and sometimes due to fluctuation of weather. The incidence of this disease is high in summer and autumn rearings. Grassarie is a contagious disease caused by a virus. The infected larva swells, the skin turns yellow and the f blood becomes milky. The incidence of this disease is high in summer when the leaves become succulent and the atmosphere is highly humid. Pebrine is a harmful disease in silkworm. The disease generally occurs through inheritance from the offsprings of the infected mother moth through the shell of the egg during the period of hatching. Besides transmission through the eggs the disease may also occur through contamination of leaves which are generally the food of the young larvae. Due to the attack of pebrine, the larva becomes undernourished, atrophied and finally dies. The biological method may be taken up for the elimination of the disease. It consists of exposing the cocoons with live chrysalids to a temperature of 34 C at the pre-pupal stage. As the larval period is very short, curing of diseased silkworm

8. Census of India, 1961 'Selected Handicrafts of Assam' P. 32.

contd..28/-

is not at all possible. It is, therefore, highly essential to adopt preventive measures like cleaning of rearing house, removal of diseased worms, feeding the larvae with mitable leaves etc. to get rid of infection of disease in different kinds of silkworm.

Tachimid fly attacks the larvae and caterpillars. Rearing house is to be protected by wire nets. Rats, lizards, ants and cockroaches etc. happen to destroy large no. of larvae. It is, therefore, necessary to adopt precautionary measures to protect the young larvae during rearing period.

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CHAPTER III

SERICULTURE DEVELOPMENT IN ASSAM

AND

A LOOK INTO VARIOUS SCHEMES UNDERTAKEN IN THE KOKRAJHAR DISTRICT

After the attainment of independence, efforts are being directed towards accelerated development of the sericulture industry in Assam through various schemes under the Five Year Plans. Assam produces about 97% of the total production of eri silk in India and in case of Muga, it holds exclusive monopoly i.e. it produces 100% of Muga silk alone.

'It is with the initiation of the five year plan development programmes that the industry came out of the old rut of pedestrian progress and made a quite significant contribution to the rural economy of the State. The First Five Year Plan schemes were principally designed to build up a sound machinery for execution of the plan programmes by turning out requisite number of trained personnel. All the three types of silk, viz. Eri, Muga and Mulberry made steady progress during the period. The Second Plan Schemes were taken up at a total allocation of Rs.50 lakhs and these formed more or less the nucleus of productivity. There was a shift in emphasis to research and training when the Sericultural Training Institute and the Sericultural Research Station at Titabar came into being. Production was very much affected by unfavourable climatic conditions and the annual level of production at the end of the Second Plan period was of the order of 2.04 lakh kg. of Eri

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cut cocoons, 0.54 lakh kg of Muga raw silk and 0.113 lakh kg. of Mulberry raw silk. The allocation for the Third Five Year Plan programmes for sericulture stood at Rs.75 lakhs. The schemes were all broad-based and production-oriented. Since seed-production is the sheet anchor in respect of an agro-industry like sericulture a bold and imaginative programme was embarked upon for the purpose, raising consequently Eri seed production to 40% Muga seeds to 30% and Mulberry seeds to over 95% of the total demand for seeds in the whole of the State. The quantum of Eri seeds was produced through the agency of the 12 Eri seed Grainages and 100 nos of Eri seed grainers were organised for the purpose. It had been possible thereby to produce at the end of the Third Plan period over 12 lakhs D.F.layings of Eri, leading ultimately to the production of 2.50 lakh kg. of Eri cut cocoons. The seed production in regard to Muga suffers an account of element of uncertainty in view of the fact that the process of Muga rearing is conducted outdoors, exposed to vagaries of nature. Through the concerted efforts of the four basic Muga farms and 142 selected seeds cocoon growers organised mostly in the Lakhimpur and Sibsagar districts, it has so far been possible to produce 30% of the seed requirement, thus leading to the production of 0.60 lakh kg. of Muga raw silk at the end of the Third Plan. The position in regard to the seed production of mulberry silkworms is very much encouraging since over 95% of the total requirement in the State has been effectively met with a production of 0.15 lakh kg. of mulberry raw silk at the end of the Third Plan. During the period of the Third Plan as many as 30 Cocoon Marketing Co-operatives have been set up for the purpose of marketing of cocoons, ensuring reasonable prices to the actual producers and doing away

contd..31/-

with the middle men profit and their malpractices'.9

The allocation for the Fourth Five Year Plan programmes in respect of sericulture was to the tune of Rs.9.5 lakhs for plain areas and Rs.13.35 lakhs for hill areas (excluding Meghalaya). Out of the total demand for seeds in the State, 56% of eri seeds, 37% of muga seeds and 90% of mulberry seeds were produced through 14 nos. of Eri Seed Grainages, 89 nos of Eri Seed Grainers, 7 Nos of Mulberry Farms and 6 nos of Basic Muga Farms. The Government of Assam has established 2 Nos of Eri Pilot Centres, covering 6 hectares each, at Beloguri and Tokenkata during the Fifth Five Year Plan, involving an outlay of 3.34 lakhs under the scheme sponsored by the North Eastern Council. During the Sixth Five Year Plan the total allocation for the sericulture industry was fixed at Rs.1834.46 lakhs.

For the 7th Plan period the approved outlay for sericulture is Rs.1045.00 lakhs out of which an amount of Rs.223.00 lakhs is earmarked for the Hill Areas. The amounts earmarked for Tribal Sub Plan and Scheduled Caste component Plan are Rs.249.00 lakhs and Rs.100.00 lakhs respectively.

The annual plan allocation for sericulture during the first year of the Seventh Plan (1985-86)

Total Plan allocation Rs.200 lakhs.
(General Areas Rs.150.00 lakhs, Hill Areas Rs.50.00 lakhs)

Out of Rs.150.00 earmarked for Hill Areas allocation for T.S.P. areas was 45.00 lakhs and that of Scheduled Caste Component Plan was Rs.15.60 lakhs.

Contd..32/-

During the Second Year of the 7th Plan (1986-87), the total Plan allocation for Sericulture was Rs.250.00 lakhs (Rs.190.00 lakhs for General Areas and Rs.60.00 lakhs for Hill Areas).

Out of Rs.190.00 lakhs meant for the general areas, the amounts earmarked for T.S.P. and S.C.C.P. were Rs.75.50 lakhs and Rs.20.00 lakhs respectively.

The Directorate of Sericulture & Weaving, Assam undertook a survey of silk industry¹⁰ in the year 1975. The survey reveals that in Assam the total no of villages having sericultural activities is 8669 and the total no.of families engaged in sericulture is 1,61,132. Area under silkworm food plants is 9820 bighas in case of mulberry and 22,317 bighas in case of muga worm. Again the total no.of food plants for mulberry is 7,49,351 and for muga the number is 7,06,976. However, it may be pointed out that the area and no.of silkworm food plants of the Government farms have not been taken into account here.

The requirement of eri seeds, as per Survey Report is 66,20,552 layings in Assam. On the other hand, the quality of seeds reared is 51,74,566 layings and the total production of cocoons is found to be 3,72,869 kg. Fourteen Departmental Eri Seed Grainings of Assam have produced 6,90,543 D.F. layings during the Year 1975.

10. A Report on Survey of Sericulture and Handloom in Assam, Directorate of Sericulture & Weaving, Assam, P.3.

Contd..33/-

Again, the requirement of muga seed cocoons is 85,12,153 nos in Assam. The quantity of seed cocoons reared is 74,83,141 nos and the production of reeling cocoons is 10,46,69,800 nos. Six numbers of Government Muga Seed Farms have covered 509.08 acres of land out of which 315 acres have been brought under muga food plantation. The total no of layings reared during the year 1975 is 15,072 and the total no. of seed cocoons harvested during 1975-76 is 2,87,016.

So far as mulberry culture is concerned, it is found that the requirement of seeds is 7,10,647 layings whereas the quantity of seeds reared is 5,89,308 layings. The production of reeling cocoons is 1,34,893 kg. Seven numbers of Government Mulberry Farms have covered 220.08 acres of land. The total no. of layings reared in the farms during the year 1975 is 7755 and the total no of layings produced during the year is 3,87,057.

We have mentioned above the findings of the Survey conducted in 1975. Now let us quote some information of a later period in relation to sericulture in Assam.¹¹ The total area of sericultural farms in Assam is 116 hectares out of which the area under plantation is 50 hectares only, as per records of 1978. Again the total area covered by eri seed grainages, is 114 hectares. Out of it the ~~xxx~~ area under plantation is 68 hectares. Basic muga seed farms have the total area of 158 hectares and the area of land brought under plantation is 99 hectares.

11. Statistical Hand Book, Assam, 1980
Directorate of Economics and Statistics, Govt. of Assam, P.131.

Contd..34/-

Production of muga cocoons is 1476 kg. Again, eri concentration centres have covered 600 hectares of land out of which 330 hectares of land have been brought under plantation. Production of eri cocoons is 16,614 kg.

The no. of sericultural villages is 4884 in Assam and the no. of families engaged in eri, muga and pat is 58,058, 3,166 and 19,096 respectively. The total area under silkworm food plants is 1659 acres (eri), 464 acres (muga) and 858 (pat). Yield of eri, muga and pat cocoons is found to be 1,27,810 kg., 12,337 kg. and 64,702 kg. respectively. Again, the production of silk yarn is 57,135 kg., 2741 kg. and 5246 kg in eri, muga and pat respectively. The total no of spinning charkhas working is 1680 only.

The total no. of reeling units is 24 and the no. of improved basins established is 85. Quantity of cocoons reeled during 1976-77, 1977-78 and 1978-79 is 12,564 kg, 8971 kg and 10,059 kg respectively. Again, the quantity of raw silk produced in reeling units during 1976-77, 1977-78 and 1978-79 is 1436 kg, 617 kg and 860 kg respectively.

That the present Government of Assam has come forward with zeal and enthusiasm to develop the sericulture industry is evident from the particulars collected from an article published in a local weekly.¹²

A full-fledged sericulture college for higher education and research is proposed to be established

12. Saptahik Nilachal, 12 Feb, 1988, P.6.

involving total expenditure of Rs.8.29 crores. The Central Government has already released an amount of Rs.50.00 lakhs. The Assam Agriculture University, Jorhat will take over the responsibility of the college. In the current year's budget an amount of Rs.10.00 lakhs has been earmarked in order to establish one Central and 15 nos. of District level Research Centres in the State with the intention of finding out and curing diseases of worms and worm plants. Moreover steps are being taken to provide financial assistance to the Department of Zoology, Gauhati University and 4 nos of research scholars to carry out research on certain problems of muga culture. The Government has taken up specific measures so that the sericulturists could get reasonable price of their products. For this purpose, muga cocoons are purchased direct from the people and spinning is carried out in the centres. This has also helped indirectly the local women in getting employment. An auction market is opened in Guwahati on experimental basis for sale of muga yarn. Training centres for imparting modern methods of spinning to the sericulturists have also been established in places where the production of eri and muga is sufficient. 18 nos. of eri spinning and 10 nos. of muga spinning centres have been established till last year. It may be mentioned here that upto 1985 the Sericulture Department, Govt. of Assam has established 25 nos. of eri seed grainages and 10 nos. of mulberry farms in the State. From the month of January, 1985 to the month of March, 1987 the Department has established 10 nos. of eri concentration centres, 5 nos of collective mulberry gardens, 3 nos. of muga food plantation centres, 4 nos of eri

spinning training centres, 5 nos of muga spinning training cum production centres, 2 nos of muga seed stations and also 2 nos. of tassar seed stations. Schemes have been drawn up to create two eri concentration centres, two muga food plantation centres, one eri spinning training centre and muga spinning training centre during the current year. Further more, 2 nos. of mulberry centres are going to be established in the Dhubri and Kokrajhar districts of Assam. It may also be pointed out that the Sericulture Department has created 20 nos. of mulberry spinning centres upto the end of the Sixth Plan in order to facilitate spinning on improved methods.

Schemes have been taken up to provide loans to unemployed youths for self employment in mulberry silk industry. During the period 1986-87 financial assistance ranging from Rs.3000/- to Rs.3500/- was granted to 420 nos.of scheduled caste families and 1230 nos of scheduled tribe families having sericultural activities, under poverty alleviation programme. Moreover, 773 nos of Scheduled Caste families, 1185 nos of Scheduled Tribe families and 300 nos. of families belonging to other communities received financial assistance ranging from Rs.500/- to Rs.1000/-. During the current year also, under the poverty alleviation programme, financial assistance from Rs.4000/- to Rs.4500/- will be provided to 255 nos.of Scheduled Caste and 620 nos. of Scheduled Tribe families. Furthermore, 321 nos. of Scheduled Caste, 320 nos. of Scheduled Tribe and 200 nos.of families belonging to other communities will be provided financial assistance in the range of Rs.500/- to Rs.1000/- as grants-in-aid.

contd..37/-

During last year 10 nos. of sericulturists were sent to Karnataka on educational tour. This year also 1000 nos. of sericulturists will be sent to Malda and Berhampur for the same purpose.

The Central Silk Board has agreed to extend financial assistance to the Government of Assam for setting up a Sericultural Development Corporation in Assam.¹³ According to the Chairman, Silk Board of India, new Muga research stations would be opened in Assam and the existing stations would be upgraded. The Board would spend an amount of Rs.11 crores next year for the development of sericulture in the State of Assam.

Sericulture schemes in the Kokrajhar district

The Department of Sericulture, Govt. of Assam has taken up good number of schemes under the purview of Five Year Plans for rapid development of sericulture in the district of Kokrajhar. Most of the schemes are, however, under Tribal Sub Plan.

The whole of the district is divided into seven sericulture circles by the Department for overall development of the industry. These are :

- | | |
|----------------------|---------------------|
| 1. Dotma Circle | 5. Besergaon Circle |
| 2. Serfanguri Circle | 6. Charebil Circle |
| 3. Bengtol Circle | 7. Kachugaon Circle |
| 4. Adabari Circle | |

13. The Assam Tribune, December 6, 1987.

contd...38/-

TABLE - 1

Expenditure involved in Family oriented Beneficial Schemes & No. of Beneficiaries

Period	Amount of Rs. spent in			Total amount spent	No of Beneficiaries in			Total No. Beneficiary
	Eri Scheme	Mulberry Scheme	Muga scheme		Eri Scheme	Mulberry Scheme	Muga Scheme	
1	2	3	4	5	6	7	8	9
1981-82	1,653.60	17,500.00	-	19,153.60	12	7	-	19
1982-83	7,971.60	17,500.00	-	25,471.60	14	7	-	21
1983-84	5,562.88	27,500.00	-	33,062.88	40	7	-	47
1984-85	77,738.72	39,800.00	26,600.00	1,44,138.72	208	84	13	305
1985-86	2,80,000.00	2,19,000.00	18,000.00	5,17,000.00	70	78	13	166
TOTAL:	3,72,926.80	3,21,300.00	44,600.00	7,38,826.80	344	183	31	558

Contd..40/-

At present there is one Eri Seed Grainage and Basic Muga Seed Farm, both established at Adabari which is located near the Kokrajhar town. The Sericulture composite centres created in the district are eight in number, Mention may be made of the Bhumka mulberry composite centre at Bhumka which is located 30 km away from the Gossaigaon town. Collective mulberry garden is located at Besergaon while eri concentration centres are established at Cithilla, Ballunguri, Ulubari and Rainadabari. There is also one Eri Nursery at Hayraguri.

Family oriented beneficiary schemes are directly implemented by the District Sericultural Department, Kokrajhar. Beneficiaries are selected by the Department with the approval of Subdivisional Scheduled Tribe Advisory Board and Integrated Tribal Development Project Board. Grants (loan/subsidy) are given to the sericulturists either in cash or kind for construction of rearing house for silkworms for purchase of rearing appliances, seed, cocoons etc. by the Department itself or through Bank. Interested rearers are also provided with necessary training through various schemes.

During the Sixth Five Year Plan, the Sericulture Department implemented family oriented beneficiary schemes in the district. These are shown in Table 1.

contd..39/-

We come to know from Table 1 that the Department of Sericulture, Govt. of Assam has spent an amount of Rs.7,38,826.80 during the period 1981-1985 among 558 nos. of tribal rearers. It is also observed that the amount of expenditure in eri scheme has increased since 1984 in comparison to previous years. On the other hand, the no. of beneficiaries has shown a downward trend from 208 in 1984 to mere 70 in 1985. It may be noted that muga schemes though introduced from 1984-85 have attracted the people to a considerable extent. In the year 1984 the no. of muga rearers (beneficiaries) was 13 which increased to 18 in 1985. But the amount spent in muga scheme in 1985 was less in comparison to the amount in 1984.

On the whole, the involvement of expenditure in eri and mulberry schemes clearly shows that the people are more interested in practising eri and mulberry rather than muga culture. But the annual increase of beneficiaries in respect of muga scheme also indicates bright future of muga culture in the district.

Detailed Analysis of the Schemes

1981 - 82

Eri Scheme :- During the financial year of 1981-82 an amount of Rs.1653.60 was spent under this scheme. The entire amount was distributed among 12 nos. of beneficiaries at the rate of Rs.137.80 per beneficiary in order to purchase spinning chakra.

Mulberry scheme :- Under this scheme, an amount of Rs.17,500.00 was spent during the year 1981-82. Seven beneficiaries received the amount at the rate of Rs.2500/- per head for development of mulberry culture in the district.

contd..41/-

1982 - 83

Eri Scheme :- During the financial year of 1982-83 an amount of Rs.7971.60 was spent in total under this scheme. A dozen beneficiaries received an amount of Rs.1653.60 at the rate of Rs.137.80 per head in order to purchase eri spinning chakra. Moreover, two beneficiaries got Rs.3000.00 each for development of eri industry.

Mulberry scheme :- Under this scheme, during the year 1982-83, an amount of Rs.17,500.00 was distributed among 7 nos. of beneficiaries at the rate of Rs.2500.00 per beneficiary for development of mulberry culture in the district.

1983- 84

Eri Scheme :- During the financial year of 1983-84, the amount of expenditure, under this scheme, was to the tune of Rs.29,562.88. Out of this amount, an amount of Rs.24,000.00 was distributed among 8 nos. of beneficiaries at the rate of Rs.3000.00 per head. Moreover, spinning chakras were distributed among 32 nos. of beneficiaries. Each chakra costs Rs.173-84. So, the price of 32 nos. of chakras becomes Rs.5562.85. Hence the entire amount earmarked for the year, under eri scheme, was spent.

Mulberry Scheme :- For development of mulberry silk industry in the district, an amount of Rs.27,500.00 was spent during the year 1983-84. In the first instalment, an amount of Rs.20,000.00 was distributed among 4 beneficiaries at the ~~xxx~~ rate of Rs.5000.00 per head. In the second instalment whole amount was distributed among 7 nos. of beneficiaries.

contd..42/-

1984 - 85

Eri Scheme :- Under this scheme, during the financial year of 1984-85, an amount of Rs.77,738.00 was distributed among 208 nos. of beneficiaries.

Mulberry Scheme :- For development of mulberry silk industry in this district, the total amount of expenditure during the year 1984-85 was to the tune of Rs.39,800.00. The whole amount was distributed in two instalments. In the first instalment 5 beneficiaries received Rs.2500.00 each while in the second instalment 72 nos. of beneficiaries received Rs.200.00 each.

Muga Scheme :- The Sericulture Department sanctioned an amount of Rs.26,600.00 during the year 1984-85 for development of muga silk industry. The entire amount was distributed in two instalments. In the first instalment, an amount of Rs.25,000.00 was distributed among 5 beneficiaries at the rate of Rs.5000.00 per beneficiary. In the second instalment the remaining amount i.e. Rs.1600.00 was distributed among 8 nos. of beneficiaries at the rate of Rs.200.00 each.

1985- 86

Eri Scheme :- Under this scheme, during the year 1985-86, the total amount of expenditure was to the tune of Rs.2,80,000.00 which was distributed among 70 nos. of beneficiaries, at the rate of Rs.4000.00 per head.

Mulberry Scheme :- During the financial year of 1985-86, an amount of Rs.2,19,000.00 was spent by the Department of Sericulture for development of mulberry silk industry in the district under family oriented beneficial scheme. The whole amount was distributed among 78 nos. of beneficiaries.

Muga Scheme :- Under this scheme, an amount of Rs.18,000.00 was spent during the year 1985-86. Altogether 18 nos. of beneficiaries received an amount of Rs.1000.00 each.

Scheme undertaken by Forest Department

For development of sericulture industry, the Forest Department of the Kokrajhar district has also taken up ambitious scheme covering the tribal dominated forest villages. During the year 1984-85 the Range Officer of Halto Gaon Range under Kachugaon Forest Division had supplied 136 units of sericultural implements to the forest villagers. Each unit consists of one spinning chakra, 200 gms of eri seed and one rearing rack. In addition to the implements, cash amount of Rs.200.00 each was also distributed in order to purchase manure and to meet accidental expenses. In this way, the Forest Department had spent an amount of Rs.1,36,000.00 for the development of this industry in the district.

Scheme undertaken by Voluntary Organisation

Besides Government's untiring efforts for developing sericulture industry in the Kokrajhar district, some voluntary Organisations have also

endeavoured for the healthy growth of the industry and have, therefore, drawn up certain schemes. For example, the Basar Gaon Mahila Samiti, formed in the year 1977, has established a Sericulture Farm at Basar Gaon. The Government has allotted a plot of land measuring about 30 bighas for the Farm. Mulberry and Sualu plants have been cultivated extensively. The Mahila Samiti has also received a grant of Rs.5000.00 from the Sericulture Department, in the year 1980, for development of the Farm. The role played by this organisation for development of the sericulture industry is really praiseworthy.

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TABLE II

Total annual income of households from all sources & total annual income generated from sericulture

Sl. No.	Name of the village	No. of households engaged in sericulture	Total annual income of the households from all sources (in Rs.)	Annual income from (in Rs.)		Total income from sericulture (in Rs.)	Percentage of income from sericulture to total annual income	
				Eri	Mulberry Muga			
1	2	3	4	5	6	7	8	9
1.	Buljuri	6	44,370	2,090	300	1,060	3,450	7.77
2.	Adabari	6	16,970	3,420	150	-	3,570	21.03
3.	Boro-Ganderbil	4	29,855	1,155	-	-	1,155	3.86
4.	Boro-Molandubi	4	12,944	2,464	500	-	2,964	22.89
5.	Bhatipara	6	39,200	2,100	-	-	2,100	5.35
6.	Narabari	6	39,950	2,750	-	-	2,750	6.88
7.	Choto-Ganderbil	5	15,900	2,800	200	-	3,000	18.86
8.	Bathabari	7	15,650	4,600	-	-	4,600	29.39
9.	Besor Gaon	8	19,510	6,610	1,400	-	8,010	41.05
10.	Thilapara	4	21,160	1,160	-	-	1,160	5.48
11.	Guebari	4	20,190	1,390	-	-	1,390	6.88
12.	Balimara Pt. II	4	7,280	1,840	300	-	2,140	29.39
13.	Bijoy Nagar	4	39,470	3,750	-	-	3,750	9.50
14.	Bhumka	6	32,073	2,318	1,140	-	3,458	10.78
15.	Mainatula	2	3,350	270	-	-	270	8.05
16.	Aminkata	6	12,950	950	-	-	950	7.33
17.	Balamguri	3	1,060	585	-	-	585	56.18
Total			3,71,882	40,252	3,990	1,060	45,302	14.18

In chapter 1 we have mentioned that the Bodo Kacharies constitute 95.4% of the total population of the tribal communities inhabiting the district of Kokrajhar, as per 1971 Census Report and with this background, our study is conducted among them in order to get a picture of the sericulture industry prevalent in the district. This chapter is particularly devoted to bring into light the activities carried out by the people and various problems faced by them in connection with this important cottage industry.

Our field investigation reveals that sericulture i.e. rearing of silkworms is being practised by the people of the district not as a primary occupation but as a subsidiary one. Moreover, it is observed that the industry is mainly confined to the womenfolk of the society. The women also practise rearing of worms as a spare-time activity only as they have to remain extremely busy with household and agricultural works. In spite of the drawbacks, we come to know from our investigation on 85 nos. of households selected from seventeen villages of the Kokrajhar and Gossai-gaon subdivisions of the district that there is an increase of 12.8% of annual income of these households due to the practice of sericulture. Although the percentage is not at all satisfactory, we may console ourselves considering their modus operandi and their little interest in carrying out this industry in scientific way on commercial line.

Detailed analysis of the total annual income generated from sericulture of 85 nos. of households selected from seventeen villages is shown against the total annual income of the households from all sources, in Table - II.

Contd..46/-

A cursory glance on Table II reveals that rearing of muga which is recently introduced in the district, is prevalent in the Belguri village only. On the other hand, rearing of eri takes place in all the selected villages. Out of the total amount of Rs.45,302/- derived from eri, muga and mulberry, an amount of Rs.40,252/- i.e. 88.85% of the total annual income from sericulture is obtained from eri alone. This indicates the popularity of eri among the people. Again, out of seventeen villages, 7 nos. of villages (41.17%) are found to be in the habit of rearing mulberry worms. The total annual income of the rearers from this source is to the tune of Rs.3990/- only. In case of the village Balamguri we observe that 3 nos. of households practise rearing of eri and the percentage of annual income derived from this source to the total annual income of these households is 56.18. On the contrary, in the village Boro-Ganderbil, the no. of households engaged in the rearing of eri is 4 and the annual income obtained from this source is 3.86% of the total annual income from all sources of the households.

From the above analysis we come to know that out of the three varieties of eri, muga and mulberry, the practice of eri culture is extensively carried out in the selected villages. Then comes mulberry. Muga culture is least practised. Table III shows the distribution of households engaged in eri, muga and mulberry.

Contd..48/-

TABLE - III

Distribution of households engaged in Eri, Mulberry and Muga

Sl. No.	Name of the village	Total no. of households engaged in sericulture	No. of households engaged in		
			Eri	Mulberry	Muga
1	2	3	4	5	6
1.	Belguri	6	4	2	2
2.	Adabari	6	4	2	-
3.	Boro-Ganderbil	4	4	-	-
4.	Boro-Malandubu	4	3	2	-
5.	Bhatipara	6	6	-	-
6.	Narabari	6	6	-	-
7.	Chota-Ganderbil	5	4	1	-
8.	Bathabari	7	7	-	-
9.	Besor Gaon	8	8	5	-
10.	Thilapara	4	4	-	-
11.	Guabari	4	4	-	6
12.	Balimara Pt. II	4	3	1	-
13.	Bijoy Nagar	4	4	-	-
14.	Bhumka	6	6	6	-
15.	Moinatula	2	2	-	-
16.	Aminkata	6	6	-	-
17.	Balamguri	3	3	-	-
TOTAL :		85	77	19	2

The above table clearly shows that out of 85 nos. of households having sericultural activities, 77 nos. (90.58%) have practised eri culture while 19 nos. (22.35%)

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of households have the habit of rearing mulberry. Only two households (2.35%) are found to be engaged in muga. It may also be pointed out that all the six households of the village Bhumka ~~practised~~ practise rearing of both eri and mulberry.

We have already mentioned earlier that out of the total annual income of the households, under study, the amount of annual income from sericultural activities is 12.18% only. There are two main factors responsible for such low percentage of income from this industry. These are (i) mode of operation and (ii) lack of interest to take up this industry on commercial basis, which we have already referred to. Now let us discuss about these factors in a detailed manner.

Our field investigation shows that the tribal people, although interest-ed in the art of sericulture, practise this important cottage industry in the traditional method. In case of eri culture, we find that the plantation of castor oil plants required for eri silkworm is not carried out by the people. Instead, they use to collect the leaves from the castor plants which naturally grow in and around the homestead in a scattered manner. But in order to get better result it is highly essential to cultivate high yielding varieties of castor oil plants and other food-plants etc. in a systematic manner. Moreover it has been observed that the people make maximum use of takli for extraction of eri thread from the cocoons, although improved method of spinning with the help of 'Ambar Charkha' which is designed by the Research Section of the Khadi and Village Industries Commission at Wardha is available. Eri and mulberry cocoons are sold in the market by the people at cheap rate. Of course, some of them use to sell the cocoons in the sericulture composite

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centres where they get reasonable price. The tribal people usually sell the mulberry cocoons as they can not afford to purchase machine for extracting thread. Without interfering with the agricultural crop, with less space requirement, the mulberry plantation helps to supply leaves for 12 years at a stretch. Thus with effective high rate of rearing and less grainage expenditure mulberry silkworm culture is more convenient than others. This is the only rational agro-industry which can be easily handled by semi-skilled labourers with the highest earning per unit area and easier quality control of the end product.¹⁴ But to speak frankly, this has not yet materialised in the district. Our field study also reveals that there is dearth of good quality of high yielding varieties of seeds. In some cases, the Government Agencies supply seeds which are not suitable for the climate of the district. For example, seeds brought from Karnataka for mulberry production are not suitable for the moist climate of the Kokrajhar district for which the larvae die premature death, ultimately resulting in low production. The local variety which is known as Shillong variety appears to be very popular among the mulberry rearing. Rearing of muga worms is an arduous task for which the people are not very much interested in muga culture. Muga worms are let loose on trees in the garden or in the jungle. As they are prey to a number of enemies when exposed - birds, especially crows, kites, bats, owls and pies - the

14. Sericulture in the North Eastern Region with special reference to Assam by Jaya (Bharali) Hazarika in the book entitled India's North East edited by Pankaj Thakur, P.246.

contd..51/-

people have to wage unremitting warfare on these enemies during the rearing period with bows and pellets, burning torches (for burning ants) and bamboo clappers. The rancous music produced by these drives away nocturnal marauders of the bird and animal kingdoms!¹⁵ Only two households out of 85 nos of households have been found to practise rearing of muga.

Absence of scientific rearing house for eri and mulberry also causes low production which indirectly means low income. For rearing of silkworms there should be provision of separate rearing house but it is observed during our field investigation that most of the people have their rearing place generally in one corner of the house where they use to stay. Our field study further reveals that the people are not interested in taking proper protection of silkworms against flies, mosquitos or other insects etc. The following table shows the no. of households taking protection of silkworms against flies, mosquitos etc.

TABLE - IV

No. of households taking protection of silkworms against flies, mosquitos and other insects

Sl.No.	Name of the village	No. of households engaged in sericulture	No. of households taking protection of silkworm
1	2	3	4
1.	Belguri	6	-
2.	Adabari	6	-
3.	Boro Ganderbil	4	1
4.	Boro Molandubi	4	-
5.	Bhatipara	6	2
6.	Narabari	6	-

Contd.52/-

1	2	3	4
7.	Choto Ganderbil	5	1
8.	Bathabari	7	-
9.	Besor Gaon	8	3
10.	Thilapara	4	-
11.	Guabari	4	-
12.	Balimara Pt.II	4	-
13.	Bijoy Nagar	4	-
14.	Bhumka	6	4
15.	Moinatula	2	-
16.	Aminkata	6	1
17.	Balamguri	3	-
Total		85	12

Table IV clearly shows that out of 85 nos. of households, only 12 giysehholds have taken protective measures against flies, mosquitos and other insects etc. for the silkworms. In other words, the no. of households taking protective measures for the silkworms is 12.94% of the total households only.

It has already been mentioned that the sericulturists are not in the habit of rearing silkworms in scientific methods. One of the reasons for non-adoption of improved techniques is their lack of interest in understanding the mechanism of the modern methods of silk-worm rearing. Whenever training programmes are organised by the Sericulture Department the people are found to be reluctant in attending the programmes. Our field study shows that out of 85 nos., only 6 rearers (7%) have attended training courses held within the district and quite surprisingly, not a single rearer has gone outside

the district for the said prupose. It, therefore, appears that proper motivation is the pre requisite for undertaking sericulture in scientific way be the people. Otherwise increase of the income of the people engaged in sericultural activities can never be expected.

The role of the Sericulture Demonstrators who are the main agents of the Government to look after the development of sericulture can not be said to be satisfactory. Our field investigation reveals that during the year 1985-86, the Sericulture Demonstrators have visited 33 households only out of a total no. of 85 households engaged in sericultural activities. In terms of percentage we find that the no. of households visited by them is 38.8% of the total households. Table V clearly shows one no. of households visited by the Sericulture Demonstrators in the selected villages during the year 1985-86.

TABLE - V
No. of households visited by Sericulture Demonstrators during the year 1985-86

Sl. No.	Name of the village	No. of house holds engaged in sericulture	No. of house hold visited by Demonstra-tor	P.C. to total
1	2	3	4	5
1.	Belguri	6	2	33.3
2.	Adabari	6	3	50.0
3.	Boro Ganderbil	4	1	25.0
4.	Boro Molandubi	4	1	25.0
5.	Bhatipara	6	2	33.3
6.	Narabari	6	2	33.3
7.	Chota Gonderbil	5	3	60.0
8.	Bathabari	7	2	28.5
9.	Besor Gaon	8	4	50.0
10.	Thilapara	4	1	25.0
11.	Guabari	4	1	25.0
12.	Balimara Pt.II	4	2	50.0

13. Bijoy Nagar	4	1	25.0
14. Bhumka	6	4	66.6
15. Moinatula	2	1	50.0
16. Aminkata	6	2	33.3
17. Balamguri	3	1	33.3
Total :	85	33	38.8

From the above table we come to know that out of 6 nos, of households of the village Bhumka, 4 households have been visited by the concerned people. The percentage of the households visited, in this case, is found to be 66.6 to the total no. of households engaged in sericulture in the village and incidentally this is the highest percentage, according to our study. Otherwise, in respect of other villages, we find low percentages. It has already been mentioned that the average percentage of 33 households visited, to the total no. of 85 households is found to be 38.8 only.

It may also be pointed out that sometimes the rearers are found to be reluctant to take the Government assistance due to the complicated official procedure or even red tapism. From our field investigation we come to know that a beneficiary has to visit the District Headquarter atleast 7/8 times to receive a petty amount of Rs.500/- only from the authority concerned. Of course, that is not the end of the beginning. The poor beneficiary, if fortune does not smile upon him, has to spend about 50% of the total amount sanctioned against him.

Lack of organised marketing facilities also poses a serious problem in the development of sericulture in the district. Most of the tribal people use to sell their silk products to outside buyers who generally come from other parts of the State or form the neighbouring

State of West Bengal, at a throw away price due to lack of good market'. The buyers are generally interested in buying the cocoons of eri or mulberry silk worm at a low rate. They take the cocoons to their own place, extract the thread and sell at higher price. Moreover they purchase eri chaddar made for both male and female from the people. Besides selling the products to outside buyers, the people also sell their sericulture products to the Government agency i.e. to the Sericulture Department and sometimes even to Central Silk Board. During our field study we have come to know from the rearers that the price offered by the Government agency is neither sufficient nor reasonable. The local traders offer high amount than the Government agency. But this is not always applicable. It has been found that the people of the Bhumka village under Gossaigaon subdivision sell their mulberry products in the local mulberry concentration centre. The rearers also sell their sericulture products in the weekly and daily markets located in and around their villages. Generally we find sale of the products at Dotoma, Safranguri, Gossaigaon and Kokrajhar town etc. Efficient marketing system is, therefore, the need of the hour.

In fine, we may conclude that the mental attitude of the people towards carrying out the sericulture industry in the traditional method will have to be removed for good by means of proper execution of the Government plans and programmes. Only then this industry will enhance the rural economy to a great extent. Let us hope that a revolutionary change through the concerted efforts of the Government and the people will occur in the near future and Assam's pride in the art of sericulture will scatter like the rays of the morning sun.

CHAPTER - V

A FEW CASE STUDIES OF BENEFICIARIES :

In this Chapter a few case studies out of the 24 (twenty four) studied families have been shown. The families for case studies have been selected on random basis.

CASE NO. 1

The informant Shri Dharju Wari of village Belguri of Gossaigaon subdivision of Kokrajhar District is a Driver of Kokrajhar Zone of ASTC by profession. During our field investigation in his village Belguri, we have found that Shri Wari is a sincere active sericultural rearer. During our interview with him, he told us that he has been maintaining his interest in sericulture from his childhood and has taken this profession as a pastime activity. According to him though he had taken this as a pastime activity, he was successful in earning some money through sericulture. According to him his income from sericulture during the year 1986-87 was Rs.670.00 only. This amount he has received by selling Mulberry thread for Rs.220.00 and two Eri Chadars for Rs.450.00 only. From our field investigation we have also found that Shri Wari also had received a sum of Rs.500.00 only from the Sericulture Department of Govt. of Assam, as grant during the year 1986-87 for improving his sericultural activities. Our investigation also reveals that Shri Wari has enough means to develop his own sericultural activities without taking any Government help. We have also known from our investigation that Shri Wari's total annual income per annum is Rs.21525.00 only which is much more above the poverty line and which proves that there is no justification of giving Government help to Shri Wari for development of sericulture by depriving other needy rearers of the village Belguri as he had enough means to develop his own sericultural activities.

Contd.57.

CASE NO. 2

The informant Shri Rajani Kanta Brahma of village Belguri by profession is an Inspector of Co-operative Society of Kokrajhar District. Though by profession he is a government officer he is very much interested in sericulture activities. During our field investigation he had informed us that he had taken sericulture as secondary pastime activity. Though it is his secondary pastime activity he is able to earn some money through it. He also told us that during the year 1986-87 he was able to earn Rs.420.00 (Rupees Four hundred twenty) only, by selling his own sericulture products. We have also learnt from Shri Brahma that in the year 1986-87 he had received a sum of Rs.500.00 only from the Sericulture Department of the Government of Assam as a sericulture grant. Our field investigation reveals that Shri Brahma's annual income per annum is Rs.13,620.00 (Rupees Thirteen thousand six hundred twenty) only, an income which is much more above the poverty line. And as such there is no justification in giving help to Brahma as he had enough means to develop his own sericulture activity.

CASE NO. 3

The informant Shri Naren Chandra Narzery of village Aminkata of Gossaigaon, Subdivision of Kokrajhar District, by profession is a L.P.School Teacher of the village L.P.School. During the field investigation in the village we have found that Shri Narzery is an active sericultural rearer of the village, who has devoted most of his leisure time in its activities. Though sericulture is his pastime secondary occupation, yet from it in the year 1986-87 he was able to earn Rs.200.00 (Rupees Two hundred) only, by selling Eri Cocoons. We were also told by Shri Narzery during our field investigation that he had

Contd..58.

received Rs.400.00 (Rupees Four hundred) only as assistance from the Sericulture Department of the Government of Assam during the year 1986-87. From our field investigation we have also gathered that Shri Narzery's annual income per annum is Rs.10,200.00 (Rupees Ten thousand two hundred) only which is much more above the poverty line and Shri Naren Narzery had enough means to develop his own Sericulture activity without taking any government help. The assistance should have been given to another needy Sericulturist of the village.

CASE NO. 4 :

Shri Amiya Narzery of village Besor Gaon of Kokrajhar District is a poor cultivator who has a great interest for sericulture. Shri Narzery has developed sericulture to a great extent though it was his secondary occupation only. He has devoted some of his time for its development and accordingly in the year 1986-87 he had received Rs.450.00 (Rupees Four hundred fifty) only by selling his own sericulture products. Shri Narzery also informed us during our field investigation that during the year 1984-85 he had received 2,500.00 (Rupees Two thousand five hundred) only from the State Sericulture Department as grant for constructing one Eri Rearing House and to purchase other rearing equipments such as rearing tray, etc. According to Shri Narzery the amount was quite sufficient for construction of the rearing house and due to the construction of the rearing house he is now capable to protect his Eri worms from mosquitoes and flies and thus his sericulture production has been gradually increasing. Moreover the Sericulture Department did a right thing by giving help to Shri Narzery since Shri Narzery's family is found to be below the poverty line having an annual income of Rs.4950.00 (Rupees Four thousand Nine hundred Fifty) Only.

Contd..59.

CASE NO. 5 .

The informant Shri Kanala Kanta Brahma of village Boro-Malandubi of Kokrajhar District is a poor cultivator whose annual income is Rs.2500.00 (Rupees Two thousand Five hundred) only, which is below the poverty line. Though Shri Brahma is a poor cultivator he had a great interest for sericulture activity and accordingly he had earned Rs.1000.00 (Rupees One thousand) only, as income from sericulture during the year 1986-87. While interviewing Shri Brahma during our field investigation in his village, he told us that in order to improve his sericulture activity he had applied for help to the Sericulture Department of Kokrajhar District and accordingly he had received a sum of Rs.1500.00 (Rupees One thousand five hundred) only, as subsidy from the Sericulture Department in the year 1986-87. This subsidy was given to him for constructing a Rearing House for Eri rearing and buying a bamboo tray which is necessary for Eri rearing.

According to Shri Brahma the amount which was given to him as subsidy had helped him for improving his sericulture production but the amount is not adequate to meet all expenses for building an Eri rearing house for which some more money is needed.

CASE No. 6

Shri Thaneswar Basumatary of village Adabari of Kokrajhar subdivision of Kokrajhar district by profession is a day labourer. During our field investigation in the village Adabari, we have learnt that Shri Basumatary used to devote some of his time for development of sericulture and accordingly he had received Rs.900.00 (Rupees Nine hundred) only, by selling his own sericulture production

Contd..60.

in the year 1986-87. Besides this, we have gathered from him that he has been trying to make one small Eri Plant garden near his house where he has about 1/2 (half) bigha of land. He also informed us that he had also approached the sericulture department for it and the Assistant Director of the Department had assured him to give help. It is further learnt that in the year 1986-87 he had received Rs.300.00 (Rupees Three hundred) only, from the Sericulture Department. The help which was given to Shri Thaneswar Basumatary is quite justified since he is a poor day labourer whose annual income is Rs.3400.00 (Rupees Three thousand Four hundred) only, per annum which is much below the poverty line. But the amount of ~~xxxx~~ assistance is found to be quite low.

CASE NO. 7

The informant Jwaharlal Mushahari of village Thilapara of Kokrajhar subdivision of Kokrajhar District, by profession a Cultivator, is a poor villager who had only 4 (four) Bighas of cultivable land. During our field investigation in the village we have found that Shri Mushahari is an efficient sericulture rearer who has taken up sericulture rearing quite extensively and it was revealed to us by him during our field investigation that in the year 1986-87 he had received Rs.1860.00 (Rupees One thousand eight hundred sixty) only by selling sericultural products which is quite a big amount in comparison with some of the other sericultural rearers of the district. Shri Mushahary told us also that in order to improve his sericulture industry he had applied to the Sericulture Department of the Government of Assam and accordingly he had received in the year 1986-87

Contd.61.

a sum of Rs.5000.00 (Rupees Five thousand) only, as a grant for developing his Sericulture Industry. The giving of sericulture grant by the Government to Shri Mushahary is quite justified because from our investigation we have learnt that Shri Mushahry is a poor cultivator whose annual income is Rs.3860.00 (Rupees Three thousand Eight hundred sixty) only, quite below the poverty line.

CASE NO. 8

The informant Shri Sa'baro Brahma of village Bhumka is a poor simple cultivator who has only 7 bighas of periodic cultivable land. Though Shri Brahma has 7 Bhigas of cultivable land the production of paddy which he gets every year is not sufficient as his family is quite a big one. So in order to meet his expenses he had taken sericulture as a secondary occupation. Though sericulture he is earning a little bit of income and in the year 1986-87 he earned Rs.208.00 (Rupees Two hundred and eight) only, which includes the income from both Eri and Mulberry. Shri Brahma told that as his income was not adequate from sericulture he decided to develop this cottage industry in a better way and accordingly he had applied to the Sericulture Department of the State Government for some help and he received Rs.500.00 (Rupees Five hundred) only from the Sericulture Department as grant for developing his sericulture activities especially the Mulberry cultivation for the year 1984-85. As Shri Brahma is a very poor cultivator whose annual income is only Rs.1858.00 (Rupees One thousand eight hundred fifty eight) only which is far below the poverty line the Sericulture Department did a right thing by giving him the grant but this grant is quite inadequate and it hardly helped Shri Brahma to come above the poverty line.

Contd..62.

From the above mentioned eight case studies it can be seen that the three informants, Shri Dharju Wari, Shri Naren Chandra Narzery and Shri Rajani Kanta Brahma had enough resources of their own for developing sericulture as a Cottage Industry and there is no justification from the Government side to give any help to these people whose income is much more above the poverty line. However, we have also seen that the rest of the five informants are quite below the poverty line and the Sericulture Department did a right thing to give help to these needy people who had great interest for sericulture but have no means to develop it properly.

Moreover it has been seen that twenty Four studies families who have received assistance from the Government, only 17 families are below the poverty line, the percentage being 70.83%.

Our observation, however, is that the amount of financial assistance given to the 17 families below the poverty line is so small that it can hardly bring the families above the poverty line in spite of the fact that such assistance has generated some monetary income.

In the next Table the actual position of the studied 24 (twenty four) tribal families of Kokrajhar District who have been rearing Eri, as well as Mulberry Silk Worms regarding their annual income, whether the families assisted are below the poverty line, the amount of assistance given to each family, monetary income generated because of the assistance, whether the families have been in a position to cross the poverty line etc., are shown.

contd..63.

TABLE - 6

TABLE SHOWING THE GENERATION OF ADDITIONAL INCOME OF TRIBAL BENEFICIARIES FROM ASSISTANCE RECEIVED FROM SERICULTURE DEPARTMENT

S1. No.	Name of Village	Name of Beneficiary	Occupation	Total annual income of the time of giving the assistance	Whether below or above poverty line	Amount of financial assistance	Amount of addl. income generated	Whether family could cross poverty line
1	2	3	4	5	6	7	8	9
1.	Belguri	(1) Shri Dharju Wari	Driver	Rs. 11,525.00	Above	Rs. 500.00	Rs. 600.00	Already above
		(2) " Umesh Ch. Basumatary	Cultivation	3,970.00	Below	800.00	670.00	Could not cross
		(3) " Rajani Kanta Brahma	Inspector, Co.op.Dept.	13,620.00	Above	500.00	420.00	Already above
2.	Moinatula	(4) " Kameswar Basumatary	Cultivation	1,700.00	Below	400.00	120.00	Could not cross
3.	Thilapara	(5) " Jawaharlal Mushahary	Cultivation	3,860.00	Below	5000.00	1860.00	Could not cross
4.	Bathabari	(6) " Kamaleswar Brahma	Cultivation	4,900.00	Below	2500.00	1900.00	Could not cross
		(7) " Abhilash Brahma	Cultivation	7,600.00	Above	400.00	600.00	Already above.
5.	Adabari	(8) " Sukhmor Mushahary	Cultivation	2,650.00	Below	500.00	650.00	Could not cross
		(9) " Thanewar Basumatary	Wage earner	3,400.00	Below	300.00	900.00	Could not cross

1	2	3	4	5	6	7	8	9
6. Bhatipara	(10) Shri Babu Ram Narzery	P.W.D. Labourer (Permanent)		8800.00	Above	500.00	400.00	Already above
7. Bhumka	(11) " Rati Kanta Brahma	Cultivation		1760.00	Below	2000.00	510.00	Could not cross
	(12) Smt. Dhanmati Brahma	Cultivation		1778.00	Below	2000.00	663.00	Could not cross
	(13) Shri Sambaro Brahma	-co-		1858.00	Below	500.00	208.00	Could not cross
	(14) " Tuliram Narzery	-do-		1907.00	Below	500.00	962.00	Could not cross
8. Balimara Part-II	(15) " Barsi Narzery	-do-		1220.00	Below	500.00	720.00	Could not cross
9. Besor gaon	(16) " Amiya Narzery	-do-		4950.00	Below	2500.00	450.00	Could not cross
	(17) " Tajendra nath Brahma	-co-		2660.00	Below	400.00	660.00	Could not cross
	(18) Smt. Monirani Narzery	-do-		14,500.00	Above	2500.00	2500.00	Above
10. Besorgaon	(19) Shri Baburam Narzery	-do-		16,400.00	Above	2500.00	1400.00	Already above
	(20) " Moheswar Narzery	-do-		6,250.00	Below	5000.00	1250.00	Could not cross
	(21) " Ratneswar Brahma	-do-		1,400.00	Below	2500.00	500.00	Could not cross

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Contd..66

1	2	3	4	5	6	7	8	9
11. Boro-Molandubi	(22) Shri Kamala Kanta Brahma	Cultivation		2500.00	Below	2500.00	1000.00	Could not cross
12. Aminkata	(23) Shri Naren Ch. L.P. Narzery School			10,200.00	Above	400.00	200.00	Already above
13. Choto-Ganderbil	(24) " Kamal Singh Basumatary	Cultivation		2700.00	Below	400.00	1200.00	Could not cross

Chapter VI

Concluding Observations & Suggestions

Sericulture i.e. rearing of silkworm is a traditional cottage industry in Assam. The importance of this industry lies in the fact that throughout the centuries it has been in existence, in spite of ravages of time, influencing the socio-economic life of the people.

Our present study attempts to throw light on the sericulture activities carried out by the scheduled tribe communities of the Kokrajhar district, and on the major problems and future prospects of this important industry in the district.

It may be mentioned here that in order to make the Report meaningful, we have drawn references to the sericulture activities in the State of Assam as a whole. Further more, the Report is divided into several chapters for systematic analysis.

In the first chapter we have presented an introduction to the sericulture industry with little touch on the varieties of silkworms and on the origin and early history of sericulture. Afterwards we have dealt with the geographical area and location, river system, soil, climate and rainfall etc. of the district. The population figures of the district, as per 1971 Census is also shown. It has been found that the total population of the district is 4.8% of the total population of the State. Again, the scheduled tribe population of the district constitutes 12.67% of the total tribal population of the State. On the other hand, the scheduled tribe population of the district is found to be 28.6% of the total population of the district. It is to be noted that the concentration of the Bodo Kacharis among the total tribal communities inhabiting the district

Contd.67.

is the highest, indicating 95.4% of the total tribal population of the district. According to 1971 Census Report, the rate of literacy in the district is 21.3% out of which male literacy is 29.8% and female literacy 12% only. As we have undertaken the present study among the Bodo Kacharis, we have also given a short note on the Bodo Kacharis, reflecting their origin, social structure, religious festivals and ceremonies and agricultural activities etc. At the end of the chapter, we have mentioned about the selection of villages on the basis of random sampling and collection of necessary data through household schedule in order to carry out the field work for our study.

In the second chapter we have referred to various plants which supply food to eri, muga and mulberry worms. Also we have described the life-cycle of the mulberry worm, with due emphasis on various stages viz. egg, larva, pupa and moth. Afterwards, a short discussion of the techniques of production viz. rearing of worms and methods of spinning is dealt with. Various diseases which destroy the worms have also been indicated.

In the third chapter we have tried to depict a picture of the sericulture development in Assam. According to a survey of silk industry conducted by the Directorate of Sericulture & Weaving in 1975 we find the total no. of villages having sericultural activities in Assam to be 8669. On the other hand, the no. of such villages is found to be 4884 only, in 1988, as shown in Statistical Hand Book, Assam, 1980. This indicates 43.6% of decrease of the sericulture villages in Assam. Again, in 1981-82 we find the no. of such villages (not shown in the chapter) to be 6910 (as per article published in Prantik, 16-31 August, 1987). This shows 20.29% of decrease in comparison to the no. of villages engaged in sericulture.

Contd. 68.

culture, as per records of 1975 but 41.4% of increase to the no. of such villages in comparison to the figures of 1978. A detailed account of the measures taken by the present Govt. of Assam for accelerating the pace of development of the sericulture industry, is also given in this chapter. If all the plans and programmes meant for the industry are executed properly we can expect a healthy growth of the sericulture industry in Assam within a short period. Schemes under the Five Year Plans are undertaken by the Deptt. of Sericulture, Govt. of Assam for development of sericulture in the Kokrajhar district. Eri seed grainage, basic muga seed farm and composite centres have helped the people to a considerable extent. Family oriented beneficiary schemes have also been taken up by the Department. It has been found that an amount of Rs. 7,38,826.80 is distributed among 558 nos. of rearers during 1981-82 to 1985-86 by the Deptt. of Sericulture. Moreover, the Forest Department of the district has also spent an amount of Rs. 1,36,000.00 for the development of sericulture industry. Basar Gaon Mahila Samiti, a voluntary organisation, has also taken keen interest in the development of the industry. The Samiti has established a sericulture farm at Basar Gaon in a plot of land measuring about 30 bighas.

In the fourth chapter an attempt is made to highlight people's involvement in sericultural activities and various problems faced by the people. It has been observed that sericulture is practised by the people as a subsidiary occupation only. It is mainly confined to the womenfolk who, in addition to domestic and agricultural works, practise rearing of worms. Even then we find an increase of 12.18% of annual income of 85 nos. of households engaged in sericultural activities.

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Out of the total annual income from sericulture, 88.85% is derived from eri culture alone. No. of households engaged in eri, muga and mulberry is found to be 77(90.58%), 2(2.35%) and 9(22.35%) respectively. This clearly reveals the tremendous popularity of eri culture among the rearers. So far as protective measures for silkworms against flies, mosquitos or other insects are concerned, we find that only 1/2 nouseholds (12.94%) out of 85 households have adopted suitable measures, Again, the no. of households visited by the sericulture demonstrators is found to be 38.8% of the total households engaged in sericulture. Our investigation also reveals that the people do not like to come forward to accept Govt. assistance due to complicated official procedure or red tapism. At the end of the chapter we have referred to marketing facilities which need to be strengthened for development of sericulture in the district.

Suggestions

Since there is sufficient scope for the development of sericulture industry in the district of Kokrajhar due to suitable climatic condition and fertile soil, we would like to put forward the following few suggestions for necessary consideration by the appropriate authority.

1. The attitude of the tribal people towards carrying out sericulture as a subsidiary occupation in the age-old method should be discouraged and sincere efforts should be directed by the Government through various plans and programmes to attract the people in undertaking this important industry as a primary occupation by means of adopting scientific methods right from plantation to the ultimate stage of production.

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- Out of the total annual sericulture, 88.82% is derived from eri culture alone. No. of households engaged in sericulture in the district is 1,00,000. (88.82%)
2. Steps should be taken to move the rearers for systematic plantation of high-yielding varieties of silkworm food plants along with application of fertilizers, provision of irrigation facilities and proper drainage etc. in order to enhance the production of leaves.
 3. Disease-free silkworm seeds have to be provided to the rearers at subsidised cost.
 4. Provision may be made for distribution of young silkworms, reared under hygienic conditions, among the rearers so as to enable them to get rid of the problems associated with early stage rearing.
 5. Rearers should be motivated to make separate provision of rearing house with modern facilities. Rearing appliances and disinfectants should be supplied at subsidised cost.
 6. Provision of modern reeling and spinning machines is highly essential in order to increase the production. It has been observed that the people use to sell the mulberry cocoons to the traders due to lack of reeling machine.
 7. Sericulture demonstrators have to visit the rearers frequently and demonstrate the latest technology in relation to the sericulture industry in addition to their normal duty.
 8. More sericulture farms and composite centres should be established in the district.

9. Training should be imparted to the rearers by the Govt. in silk reeling, twisting of silk yarn and in eri silk spinning. Moreover efficient rearers may be sent to various places outside the State so that they can acquaint themselves with up-to-date technology.
10. Financial assistance should be provided by the Govt. to the needy rearers only and there must be proper evaluation of the utilization.
11. Marketing facilities should be streamlined for the convenience of the rearers.
12. Although the tribal people are found to be much interested in rearing eri rather than muga and mulberry, it is to be noted that practice of eri culture on large-scale is not only cumbersome but also less profitable. It is, therefore, necessary to motivate the people to adopt mulberry culture in scientific way for enhancing their economic condition. Rearing of muga is not popular among the tribal people of the district. Government should take necessary steps to popularise muga culture through publicity and demonstration among the people.

FINDINGS OF THE REPORT

1. Sericulture, the traditional agro-based cottage industry, plays an important role in the socio-economic life of rural Assam. The characteristic feature of this industry is that it has existed among the people since time immemorial, through many ups and downs. The sericulture industry consists of rearing of eri, muga and mulberry silkworms.
2. Considering the tremendous popularity of the sericultural activities among the Tibeto-Burman elements in Assam from the remote past, it may be assumed that there is every possibility of acquiring the art of sericulture by these people during their migration to Assam from the original habitat i.e. China.
3. According to 1971 Census Report, the scheduled tribe population of the district of Kokrajhar constitutes 28.6% of the total population of the district. But the Bodo-Kacharis consist of 95.4% of the total scheduled tribe population of the district. Literacy rate is found to be 21.3% in the district as against 28% of the State of Assam.
4. Eri silkworms are fed mainly on the leaves of Castor Oil (era) plants while the mulberry and muga silkworms are fed primarily on the leaves of mulberry (nuni) and som plants respectively.

Contd. 73.

5. Various diseases attack the silkworms. Mention may be made of flactierie, grassarie and pebrine etc. Precantionary measures have to be adopted in time, otherwise total elimination of a brood is not impossible.
6. Development programmes under various Five Year Plans have led to the improvement of sericulture industry to a considerable extent.
7. The total no. of sericulture villages in Assam, according to the survey undertaken by the Directorate of Sericulture & Weaving, Assam is 8669 in 1975. But the no. of such villages is reduced to 4884 in the year 1978, as shown in the Statistical Hand Book, Assam, 1980. Again we come to know from an article published in Prantik, 1987 that the no. of sericulture villages in Assam is 6910 in 1981-82. On the whole it may be said that the pace of development is not uniform. In other words the sericulture industry has experienced ups and downs.
8. The present Govt. of Assam has undertaken specific measures for the improvement of the sericulture college, district level research centres, auction market and also training centres for imparting modern methods of spinning. Over and above, financial assistance has been provided to the people under poverty alleviation programme. In order to set up a Sericultural Development Corporation in Assam the Central Silk Board has already agreed to extend financial assistance to the Govt. of Assam.

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9. The district of Kokrajhar has been divided into seven sericulture circles - Dotma, Serfanguri, Bengtol, Adabari, Besergaon, Chorebil and Kachugaon for proper development of the sericulture industry in the district. Moreover, eri seed grainage and the basic muga seed farm, both located at Adabari have extended help to the sericulturists. Eight composite centres established in different parts of the district, the collective mulberry garden located at Besergaon, various eri concentration centres, the eri nursery at Hayraguri have put the rearers in an advantageous position in carrying out sericultural activities.
10. Family-oriented beneficiary schemes have been implemented by the District Sericulture Department, Kokrajhar. In this case, the beneficiaries are selected by the Department with the approval of Subdivisional S.T. Advisory Board and I.T.D.P. Board. Grants either in cash or kind are also provided to the rearers for construction of rearing house and for purchase of rearing appliances, seeds and cocoons etc. The total amount of expenditure involved in family oriented beneficiary schemes (eri, muga and mulberry) during the period 1981-85 is to the tune of Rs.7,38,826.80 among 558 nos. of beneficiaries. The highest no. of beneficiaries (344) is found under eri scheme while the lowest no. (31) is under muga scheme. The no. of beneficiaries in mulberry scheme is found to be 183. This reveals the fact that the people are much more interested in rearing of eri and mulberry silkworms. It may be noted that muga schemes have been implemented since 1984 only. The no. of beneficiaries is on the increase and it can be

Comtd. 75.

- expected that muga culture may flourish in the district in the near future.
11. The Forest Department of the Kokrajhar district has also undertaken scheme to improve the sericulture industry. The Halto Gaon Range Office has supplied 136 units of sericultural implements to the people of the forest villages during the year 1984-85. Each unit comprises one spinning Chakra, 200 gms of eri seed and one rearing rack in addition to cash amount of Rs.200.00 each. Thus the Forest Department has spent an amount of Rs.1,36,000.00 for the improvement of the sericulture industry.
12. The role played by the voluntary organisation in the development of sericulture also needs to be mentioned here. The Basar Gaon Mahila Samiti has established a sericulture farm in a plot of land measuring about 30 bighas offered by the Govt. of Assam in the year 1977. The sericulture department has also offered a grant of Rs.5000.00 in 1980 to the Samiti for development of the sericulture farm.
13. Although the people practise sericulture as a subsidiary occupation only, even then we find an increase of 12.18% of annual income of 85 nos. of households engaged in sericultural activities. The total amount of income generated from sericulture of these households is estimated at Rs.45,302.00 as against total annual income of Rs.3,71,882 from all sources. It may be mentioned here that the annual income from eri culture along constitutes 88.85% of the total annual income generated from sericulture.
14. Out of 85 nos. of households, 77 nos (90.58%) are engaged in rearing of eri and 19 nos. (22.35%) in

Contd..76.

mulberry silkworms. Only two households (2.35%) practise rearing of muga.

15. There is no systematic plantation of food plants. These grow naturally in the surrounding areas of the homesteads. As a result, scarcity of leaves may put the rearers in a difficult position. It has also been observed that people are in the habit of using takli for extraction of eri thread from cocoons although improved variety of 'Ambar Charkha' is available. The people also use to sell mulberry cocoons due to lack of reeling machine.
16. Most of the rearers do not have proper rearing house for silkworms. A corner of the house where they stay is used for rearing purpose. But scientific rearing house is highly essential.
17. No. of households taking protection of silkworms against flies, mosquitos and other insects is found to be 12 only out of 85 households, the percentage being 12.94.
18. The sericulture demonstrators have visited 33 nos. of households during the year 1985. In other words, the no. of households visited by them is 38.8% of the total households engaged in sericultural activities.
19. Without proper marketing system development of sericulture industry can not be expected. Our investigation reveals that lack of organised marketing facilities has hindered the healthy growth of sericulture in the district.