CHAPTER-I

INTRODUCTION

1.1 What is Lac?

Lac is a resinous encrustation, formed around the bodies of microscopic tiny lac insects by its own secretions and excretions after it has been cultured on the barks of lac host trees, the most important of which are the Kusum, the Palas and the Ber or Kul. The resinous secretion which is known as sticklac contains about 4-5% wax and 1% water-soluble colouring material known as lac-dye (laccaic acid). Actually, lac is the oldest form of resin known to humankind.

Among the lac insects species reported from this region, only Kerria lacca (kerr) is being cultivated for production while others are still unexploited. Two different strains of this species, the Rangini and the Kusumi contribute nearly 95% of the total lac production of the country. The Rangini strain doesn’t thrive on Kusum (Schleichera oleosa) but performs well on other host plant species. It is a bivoltine strain having a four months (rainy season) and eight months (summer season) life cycle. The Kusumi strain on the other hand has a more or less two-equidurational life cycle in a year and prefers Kusum (Schleichera oleosa) for production of light coloured resin of superior quality with respect to life and flow.

Sticklac is converted to commercial grades of seedlac and then shellac. The yield of processed lac from sticklac varies between 40-60% depending on the host tree, area of cultivation and other factors. Apart from lac resin, sticklac contains 6-7% of lac wax, 3-5% of water moisture, colouring matter (lac dye), and impurities like insect debris, wood pieces, sand etc. The refinement of sticklac into seedlac is mostly carried out in cottage scale or in semi mechanised factories. After refinement, seedlac is converted to shellac by hand-made or machine-made process.

1.2 Historical and Literary References

People have been cultivating lac for at least three to four thousand years. The earliest reference is traced to Vedic period. Atharva Veda (1500 B.C.) devotes a complete chapter of
nine couplets containing vivid description of lac host plant and use of lac as medicinal drink and wound healer, wherein lac is termed as Laksha. This Veda also gives a brief account of lac insect in poetic language, a prayer charm addressed to the fully developed adult female lac insect personified as a beautiful young maiden.

We get a few more references of lac from ancient Sanskrit literature. Panini in the Astadhyayi (IV Kanda, Sutra 2) mentions lac or laksha as a dying agent. A reference to lac also occurs in the grammar of Panini (550 B.C.) There are references of such use of lac-dye in Vijayapura, the capital of Lakshmansena, described by Dhoyi in the Pavanduta (V Kanda, Sutra 34). The great Sanskrit poet Kalidasa also referred to lac in Abhijnansakuntalam (IV Kanda, Sutra 5). The great poet Bharvi mentioned about lac in Kiratarjuniyam (V Kanda, Sutra 23). Kalidasa also referred to lac in Ratisamharam (VI Kanda, Sutra 13).

There are references about lac in the Mahabharata in the Varanavata Adhyaya or Jatugriha Parva that the Kaurava machinated to kill the Pandavas by asking them to live in a house of lac, known as Jatugriha or Lakshagriha, built by Purochana. This story is about four thousand years old. In Ramayana we find references to its use as cosmetic to colour hand and feet red. Therefore, it is proved that thousands of year back, people used to collect and grow lac and put it to different uses. Several references of using lac are also seen in Vinayaka text of Buddhists. This text describes in detail the method of extraction of lac dye, and its application in dyeing.

In different excavation reports there are copious references about lac ornaments. Bright red and green shellac (one of the lac products) bangles were once used in India in the Protohistoric period. In Mohenjodaro also, bangle of metal, lac coated toys and pottery works of shellac have been found. The excavated lac-beads from the site of Chandraketugarh are now preserved in the Ashutosh Museum. Age of Chandraketugarh is supposed to be from the 3rd century B.C. to the end of the Pal period.

Ancient Chinese and Indian civilizations used the dye extracted from lac for dyeing silk and leather and as cosmetic rouge and a colouring for head ornaments. The superior adhesive quality of the resin made it useful for setting jewels and sword hilts as well as
repairing broken pottery. The residue left after the extraction of the dye was made into a grinding wheel for jade - a technique still in use today.

Lac was used in the middle ages in Asia and Europe for making sealing waxes in view of its ability to reproduce very faithfully very delicate inscriptions. There are innumerable references to lac also in the old manuscripts of these centuries from the 16th centuries onwards, pertaining to its growing use in those days.

In 1563 Garcia de Orte, a physician to the Portuguese Governor of India, published a lucid account of both lac resin and lac dye. Later on, the king of Portugal sent out a scientific mission to India in 1596 A.D. under the leadership of John Huyglen Von Linschoeten who prepared a comprehensive list of the uses of lac.

Ain-i-Akbari (1590 A.D.) of emperor Akbar’s reign gives details of the use of resin for polishing and lacquering wood in public building, using mixture of purified lac and bright coloured pigments, melted into sticks like sealing wax, as in lac turnery even today. The resin was being used for much earlier times for filling hollow gold and silver jewellary.

Tavernier recorded in 1876 A.D. that in India lac-dye was used for calico-printing and lac-resin for sealing waxes and polishes. Later it came to be used for moulding beautiful caskets with elaborate designs.

Centuries ago, the Hindu women introduced the fashion of colouring their feet and hands with alta, which is cotton pad soaked with the soluble lac-dye. This custom still prevails.

It has evidence that in India the processing of extract of lac dye by washing raw lac with water and squeezing out the resin by heating lac in a cloth bag in front of a fire have been practicing for several centuries. Similarly many of the present applications of lac in Indian arts and crafts are also of ancient origin.
1.3 Why the Study is Being Made

i) Lac Cultivation in Purulia:

Purulia is the main lac producing district in the state of West Bengal while Midnapore and Bankura are next in importance. Small quantities of lac are also produced in Birbhum, Murshidabad and Malda districts. For the last twenty years Purulia itself contributes almost 90% of total lac production of West Bengal. The main centres of lac cultivation in Purulia are Tulin, Jhalda, Baghmundi, Manbazar, Gar-jaipur and Raghunathpur.

ii) Employment Generation and Socio-economic Upliftment:

Lac is of considerable economic importance in the life of forest fringe communities especially poor tribal and other marginalised groups in the district of Purulia. Seventy thousand cultivators are engaged here in lac cultivation out of which 60% belong to ST/SC and other economically backward communities of the district. Adoption of scientific technology in lac cultivation, lac processing and lac industrial activity would help to enhance income and employment opportunities to these people. It would also help to improve the attitudes of tribal not to destruct forest for their livelihood. In this study the researcher would like to emphasise the role of lac industry in socio-economic upliftment of the forest dwellers in the district without displacing them from their habitat. Besides, it has high potential for generating employment for both men and women during the slack season of agriculture in the lac growing regions of the country. Employment is generated in three stages: a) Cultivation of Lac; b) Processing of Lac; and c) Trading of Lac (both internal and external trade).

iii) Employment Generation through Cultivation:

Lac cultivation is being carried out by all type of farmers i.e. marginal, small and big farmers who possess lac host trees. Lac cultivation is mainly done on palas, ber and kusum trees which are available in plenty in agricultural fields, embankments, unused land, degraded land and forest land of the lac growers. Rural employment is generated from the preparation stage of lac cultivation through pit digging, planting, watering of seedling and
fencing work. The various stages of cultivating lac viz rearing of lac insects, collection of stick lac and brood lac provide employment to the people of vulnerable sections of the lac growing region. Mature or immature (ari) crop along with branches are cut down and lac encrustation is scraped by the cultivators. Lac culture is an economically important vocation practised by 3 to 4 million cultivators in different states of India including 99,000 cultivators belonging to the economically backward classes.

In Table-1.1, it is shown how and in what extent the employment in man days is created in different stages of cultivation of lac, which is termed as crop operation. This survey has been conducted for four years (2008-2012). The data are shown for three major host trees. Then for comparison the same data of national level (from the survey report of I.L.R.I.) have been taken. At last per hectare employment generation for each host tree is calculated, which is simply the number of existing particular host trees per hectare multiplied by each tree’s employment generation capacity. Comparison of efficiency of each host tree in this respect is made possible. Total employment generation capacity can be compared tree-wise as well as location-wise between Purulia and Nation’s figure.

**Table-1.1: Employment Generation per annum on Major Host Trees (per 100 hosts)**

<table>
<thead>
<tr>
<th>Crop Operation</th>
<th>Man-days per annum</th>
<th>Palas</th>
<th>Ber</th>
<th>Kusum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Pruning</td>
<td></td>
<td>10</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Bundling, Selection &amp; Inoculation of Broodlac</td>
<td></td>
<td>12</td>
<td>29</td>
<td>88</td>
</tr>
<tr>
<td>Phunki Removal and Collection</td>
<td></td>
<td>8</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Harvesting &amp; Collection of Broodlac/ Lac stick</td>
<td></td>
<td>20</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>Scraping of Phunki</td>
<td></td>
<td>5</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Pruning, Ari Collection and Scraping</td>
<td></td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Scraping of Lac from Sticks</td>
<td></td>
<td>-</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td>Spray of Insecticides &amp; Fungicides</td>
<td></td>
<td>15</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Total (Purulia)</td>
<td></td>
<td>90</td>
<td>177</td>
<td>581</td>
</tr>
<tr>
<td>Total (National)</td>
<td></td>
<td>80</td>
<td>157</td>
<td>481</td>
</tr>
<tr>
<td>Per Hectare Employment Generation (Purulia)</td>
<td></td>
<td>269</td>
<td>776</td>
<td>529</td>
</tr>
</tbody>
</table>

Source: From Field Survey conducted at Baghmundi, Jhalda, Balarampur in the course of research work

*iv) Employment in Processing of Lac:*

Post-harvest refining of lac for value addition has provided employment to thousands in processing industries (where sticklac is being processed into seedlac & shellac) throughout the year. Lac culture is a labour-intensive activity, which provides opportunity
for employment especially to rural women as they carry out many of the operations rather efficiently. This can be used as an effective tool for providing economic independence to the women in backward castes. Thus importance of lac industry in poverty alleviation and socio-economic upliftment of rural folk should not be underestimated. Lac industry is of considerable economic importance in the district of Purulia as it engages over 2,500 workers per day. On an average 4,300 tonnes of sticklac are produced per year depending upon the season and price-factor. About 135 factories and 23 processing units (besides numerous unregistered small family processing units) and 9 brood lac farms are situated in the district of Purulia.

v) Dismal Production Performance:

Inspite of all potentialities, lac is fighting a dying battle in the Purulia district of West Bengal. Its performance in the production front is dismal. During the last few decades, the production of lac in this district has gone down and average annual production during the last 10 years was 1110.9 tonnes, while national figure of that is 15,000 tonnes. This commodity has witnessed a high degree of ups and downs during the 20th century. The fluctuations are so high that some time people associated with it have to face trouble to the extent of leaving its cultivation, processing and trading of lac and shift to other suitable sustainable and remunerative alternative occupations. During the last two decades, a continuous declining trend is being noticed in the number of factories and average number of workers employed in the factories.

vi) Prospect Features in Recent Times:

But it is noted that there is a continuous advancement towards increasing use of lac, the eco-friendly natural resin, with multifarious properties in the advanced countries. Actually the situation during the last few years seems to be changing in favour of Indian lac. The demand is again increasing and the price of shellac (processed lac) has also gone up considerably (From Rs 30 per kg in 1984-85 to Rs 220 per kg in 2006-07 and Rs 710 per kg in 2011-12). Various state Govt. agencies/ departments, private voluntary organisations like TRIFED, NAFED, NABARD, and KVIB are involved effectively in enhancing lac production through arranging credit facilities and marketing facilities. On behalf of Institute of Forest Productivity (IFP), Indian Lac Research Institute (ILRI) and Shellac Export
Promotion Council (SEPC) there is also no dearth of research on advanced methods of lac cultivation and varied uses of lac. Moreover the climatic and topographical condition in this district is not favourable for cultivation of traditional cereals instead, the cultivation of lac is easy with least input and labours resulting in four crops in a year.

Given huge prospects of lac-industry in Purulia this study has been undertaken to identify the nature of the problems faced by this industry, and also to suggest remedial measures for the revival of it.

1.4 Objectives of the Study

The main purpose of this study is to identify & analyse the problems and prospects of lac industry in the district of Purulia. To achieve the main purpose and to give direction to the study the following specific objectives are set forth:

(i) To identify the problems of lac growers in the district
(ii) To consider cost-yield analysis of lac growers
(iii) To analyse price fluctuation of sticklac and to find out its impact on production and marketing of sticklac.
(iv) To identify the problems faced by lac processors (manufacturers).
(v) To find out the domestic consumption & trade of lac processed goods.
(vi) To analyse the income and employment generation capacity from cultivation to processing of lac goods.
(vii) To find out the ways and means for improving the current situation of lac industry in the district and to throw light on the prospect of lac industry in the district.
(viii) To review the measures adopted by government agencies for helping the lac industry and to suggest policy measures, that should be taken by the government agencies for the growth of lac industry.

1.5 Scope of the Study

Lac is of considerable economic importance in the life of forest fringe communities, especially poor tribal and other marginalised groups, in the district of Purulia. Seventy thousand cultivators are engaged here in lac cultivation out of which 60% belongs to ST/SC
and other economically backward community of the district. Adoption of scientific technology in lac cultivation, lac processing and lac industrial activity would help to enhance income and employment opportunities to these people. It would also help to improve the attitudes of tribal not to destruct forest for their livelihood. In this study the researcher would like to emphasise the role of lac industry in the socio-economic upliftment of the forest dwellers in the district without displacing them from their habitat. Again Lac cultivation is not a large scale plantation or farming. The poor lac cultivators can easily take up lac cultivation for their livelihood. Many jobless tribals collect valuable woods from forest to earn some income. But planting and cultivating lac hosts preserve the forest from illegal cutting of trees. In lac producing areas of the Purulia district, integration of lac with agriculture would help in ecological balance and welfare of tribal.

1.6 Review of Literature

Considering the immense importance of lac in scattered areas of rural India having its unique contribution in foreign exchange earnings and providing means of subsistence, various studies have been made focusing various aspects of lac industry. Some of these studies are mentioned here in brief.


2. S.C Sengupta (1972) in his article “Twenty Five years of Research in Lac”, published in Indian Farming Vol. 22 No. 7 summarises the studies on various aspects of lac industry that is cultivation, processing, production, selling and market operations and utilizations.


4. A study of socio-economic profile of lac culture is presented by S.K. Saha & S.P. Bhardwaj in their article “Lac Cultivation-A Socio-economic Study” (1985-86), Published in Indian Shellac- Issue 85. It states that the tribal and other sections of
society engaged in lac cultivation and related activities because it is a good cash crop. Merchants as well as part-time employed persons are attracted by the lac production, cultivation, collection and marketing.

5. In the proceedings of the national seminar on *Lac Industry- Challenges and Solutions* (1997) published by ILRI Ranchi B. Ekka in his article “Lac Growers-Experience From Field” highlights the challenges and solutions faced by the lac growers. R. K. Chaturvedi discussed, in his article “Role of Co-operative in Lac Marketing”, the same thing from the viewpoint of lac marketing sector. Important studies also have been done here to identify the problems related to lac production. D.K Bannerjee in his article “What Does the Future Hold for Lac” argued about the future prospects of lac industry through inventing various uses of shellac.


8. A.K. Jaiswal, K.K. Sharma and K.K. Kumar (2003) in their article “Problem of Lac Growers in Jharkhand State” published in *Journal of Non-Timber Forest Product* Vol. 10 No. 1&2, have attempted to highlight various problems faced by lac growers. They are of the opinion that all the problems become aggravated because of the poverty of lac growers.

9. “The Atlas of Indian Lac” (1958) provides at a glance useful information and statistical data on lac and its cultivation, and all-important aspects of lac industry and trade, making it possible to view the problem facing the commodity in proper prospective.

10. Saha S.K. (1976) in his article “Lac Industry in India” published in *Indian Farming* Vol. 26 No. 6 made an attempt to discuss about shellac industry in different centres, Mirzapur, Jhalda, Balarampur, Tulin, Ranchi, Palamau, Pakur, Madhyapradesh and Umaria.
11. Reports on Problems and Difficulties of Manufactures & Consumers of Lac in India, Published by I.L.R.I (Ranchi), 1985 Different aspects are analysed in this book which is given as follows-
   a) Lac development and its present, past and future programmes
   b) Lac culture and its impact on generation of income and employment
   c) Lac industry and utilization
   d) Prospects of lac production in the then Bihar
   e) Role of BISCOLAMF and other co-operatives in lac marketing.

12. Agarwal S.C; Jaiswal A.K & Krishna Sharma K(1998) in their article, “Problems and Prospects of Lac Culture in India” in Journal of Non Timber Forest Products. Vol.5 No. (1&2) have made an attempt to highlight the various problem and prospects of lac culture and suggested the ways and means to overcome the problems.

13. ILRI (Indian Lac Research Institute) Annual Report 1979& 80, 1987, 1986, 1989-90 concentrated its attention for improvement of lac culture in Purulia District to meet the future challenges. Problems of lac processing and export, marketing problems at growers’ level especially in Purulia district have also been studied here.

14. The thesis “Economics of Lac Industry in India” by Ratna Mukherjee (2002) has attempted a detailed analysis of important economic variables related with lac industry with the help of empirical data. In the course of study and analysis, certain glaring problems are visualised.


16. Industrial Uses of Lac, Published by Shellac Export Promotion Council, Calcutta (2000) Lac possesses a rare combination of very desirable properties and thus finds a wide range of applications. These applications are shown in the book “Industrial
Uses of Lac:” It also throws light on the importance and uses of lac from ancient time to modern industries.

1.7 Research Gap

There is a consensus among the experts that lac continues to be one of the main industries in the district of Purulia but it is disheartening to note that studies on the problems related to lac industry in the district of Purulia are insufficient. The works which have been done on it are either too old or fragmentary in the sense of covering either particular aspects of the lac industry or particular time period in connection with all India study.

Thus it is seen that the study related to the problems and prospects of lac industry in Purulia District is really lacking. So it may be worthwhile to fill up this research gap. The present study considers both lac-agriculture and lac-industry in this connection.

1.8 Data Source and Methodology

The present study is based on data collected from primary as well as secondary sources. For the collection of primary data surveys have been conducted in the lac growing areas of the district of Purulia such as- Balarampur, Barabazar, Baghmundi, Manbazar, Purulia, Jhalda, Jaipur and Tulin. Survey of lac farmers in those areas has also been conducted to identify the problems of lac growers.

Survey has also been conducted in a few lac processing units- in Balarampur, Jhalda and Tulin to find out the current status of lac industry and their problems. Through this survey primary data on price, consumption, income, employment, cost-yield analysis etc. have been collected.

Data are also available from certain secondary sources. The secondary sources of data are reliable and sufficient. Government agencies, research bodies provide ample data for analysis. These secondary sources are: Annual Report of Shellac Export Promotion Council, Kolkata; Annual Report of the Institute of Forest Productivity, Ex-Directorate of Lac Development (Indian Council of Forestry Research and Education); Annual reports of Indian Lac Research Institute, Namkum, Ranchi, Reports and publications of JHASCOLAMF (Jharkhand State Co-operative Lac Marketing Federation Ltd) Ranchi;
“Statistical information of Lac – at a glance”- SEPC, CALCUTTA. etc. In this regard substantial help has been available from Balarampur Laksha Kshudra Kutir Shilpa Babasayee Samity, Chapra Byaparik Samity, WB Lac Artisan Co-operative Society (all three are situated at Balarampur in Purulia district).

The collected data have been analysed by using appropriate statistical tools such as mean, standard deviation, co-efficient of variation, correlation and regression analysis etc. The study is exploratory in nature. As such no hypothesis is postulated for the study.

To analyse the trend of annual average production, employment and export trend equation have been fitted by OLS (Ordinary Least Square) method and significance of trend co-efficient has been examined by ‘t-test’ and ‘F-test’. To analyse the growth rate we use simple linear trend analysis.

1.9 Chapterization Scheme:

The present study is divided into following chapters:

- Chapter – I : Introduction
- Chapter – II : A Profile of Purulia District
- Chapter – III : Lac in India
- Chapter – IV : Lac in West Bengal
- Chapter – V : Lac Production in Purulia District.
- Chapter – VI : Conditions of Lac Agriculture
- Chapter – VII : Conditions of Lac Industry
- Chapter – VIII : Analysis of Growth Pattern of Lac Industry
- Chapter – IX : Conditions of Lac Trade
- Chapter – X : Summary, Conclusions and Suggestions.