THE ARTISANAL SILK INDUSTRY OF WEST BENGAL: A STUDY OF ITS HISTORY, PERFORMANCE AND CURRENT PROBLEMS

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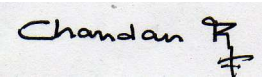
DECLARATION

I declare that the thesis entitled 'The Artisanal Silk Industry of West Bengal: A Study of its History, Performance and Current Problems' has been prepared by me under the guidance of Dr. Sanchari Roy Mukherjee, Professor, Department of Economics. No part of this thesis has formed the basis for the award of any degree or fellowship previously.



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Abstract

Artisanal silk industry is a highly labour and land intensive activity ideally suited for the vastly populated, agro-based economy like India. While farmers in the rural areas practice sericulture activities, silk weaving and production of silk goods are concentrated in the urban towns and cities. Thus it interlinks both agrarian and cottage based industrial economy and hence has a widespread impact on employment and income generation. Moreover, there is a substantial involvement of women in this industry, thus challenging the prevalent gender-bias in employment and income generation.

Silk was discovered earliest in China and from there it spread to different parts of the world, including India. During medieval period, silk production was practiced in India as a dependable livelihood. Silk production was also greatly patronized under Moghul Rule in India. During the 16th Century, commercial production of silk was started in Bengal. by the last ruling Sultan Hussain Shah and since then Bengal silk started prospering. Eventually, Kassimbazar and Murshidabad in Bengal became a major hub of silk trading in India. From the mid of 17th century, silk trade in India started flourishing as the demand for cheaper Bengal Silk began to rise in the European market. The British traders soon realised that only the low price of silk will not be enough to retain their market, and so they introduced new filature technology, which was not suitable for the economy at that point of time. After the erosion of rights to monopoly trade, the EEIC started selling off its filatures, thus spelling its gradual decline. The socioeconomic condition of the silk artisans deteriorated further as silk became one of the major hindrances in the progress of Industrial Revolution leading to the corresponding promotion of Manchester silk.

After independence, attempts were made to transplant the temperate sericulture technology in the silk producing states like Karnataka and West Bengal but it failed to bring the desired result for the latter. The basic edifice of the silk-industry in India had been built on the strength of its strong domestic demand. This domestic supply crunch has led the country to rely more on imported silk and the increasing dependence on imported bivoltine silk, which is of premium quality while being offered at a cheaper rate, causing ruin of indigenous poverty stricken silk artisans. To counter this effect, the bivoltine production has been started in India, but its success was restricted only to specific regions. West Bengal fails to add any substantive value to the export basket, the primary reason behind this being that, *nistari* multivoltine is largely produced in West Bengal while the popular bivoltine silk is produced at a negligible percentage.

However, the productivity level of sericulture is not low compared to that of the major silk producing states in the country. A state level comparison confirms that land based productivity is not hindering the growth of mulberry sericulture in West Bengal while progress of the artisanal silk industry reveals several loopholes. Small holdings and poor economic condition of the artisans have been identified as the major impediments. The rural moneylenders utilize this to their advantage and extract a major part of the pay-off intruding into the supply chain of the industry. In the absence of institutional control and well-linked credit system coupled with financial illiteracy, the development of these rural artisans seems still a far cry. Grave issues concerning the silk artisans include volatile price of silk cocoon and silk yarn, lack of region specific mulberry variety as well as inadequate coordination between technology yielding laboratory and cultivation field, competitive import price threat from China and infrastructural bottleneck across the states. Sericulture in West Bengal failed to develop beyond the districts of Malda, Murshidabad and Birbhum. Malda produces 75% of the state's production and hence occupying a pivotal role in production of mulberry raw silk in West Bengal.

Income and employment generations are the major potentials of this sector as they include the wealth transferring capability from high end urban customers to poor artisans. During 2007-12, although state production of raw silk rose from 1660 MT to 1924MT, the employment generation shows a

enormous decline from 3.03 lakh to 2.71 lakh. Against a national perspective, income generation, area of mulberry cultivation and price of reeling cocoons have been deduced as significant explanatory variables for income growth while the primary analysis in the Malda exposes that number of man-days generated from different phases of silk-worm rearing activity actually influence the total income generation of the artisans. On the other hand, cost of machineries and implements and loans taken by household farms have positive effects on income generation of the sericulture farms. This in a way establishes that rich and wealthy farmers who are expected to bear higher production cost have greater income generating capacity from this artisanal silk industry. The rural sericulture oriented villages are inhabited by small farmers with modest capital base and thus have limitations in income generation. This also justifies the declining number of sericulture farmers in West Bengal over the last decade or so.

On the other hand, from the employment perspective, West Bengal occupies highest number of 'families involved per village ratio' compared to other silk producing states. But in the last decade, the growth in sericulture has declined in terms of involvement of villages and families in West Bengal. Interestingly, the primary survey analysis on Malda reveals that area of mulberry cultivation, educational background of family head and total man-days creation have an inverse impact on the level of average employment generation in rural West Bengal. On the other hand, rise in household size and numbers of male and female hired labour have positive impact on the average level of employment generation in a sericulture family farm.

The thesis attempted to explore the hidden issues behind the ostensible 'predominance of female workers' in this artisanal sector of West Bengal. Employment of women generates a superior impact on the nutritional and educational level of the children. In case of West Bengal, the primary analysis shows that higher percentage of female members in the household, wage accruals to the hired female workers and family empowerment of female household members can raise the gender dominance of the sericulture farms resulting in higher levels of female engagement in sericulture. However, with an increase in household size, an additional pressure is placed on the women to undertake domestic unpaid work and household maintenance, while a greater number of male workers is initiated to join the sericulture farms, possibly due to higher returns, thus displacing the female workers.

In order to overcome such bottlenecks, the Directorate of Sericulture adopts certain targets annually which leave marginal impact in its stages of implementation. Increase in area of mulberry cultivation is shrinking in West Bengal, which can be considered as one of the major factors for the slow growth of sericulture in this part. Improved mulberry variety is to be planted with greater care for manures and fertilizers. Innovations and technologies need to be directed to the generation of more output in cost effective ways. Quality yarn needs to be produced by the domestic farms so that aggressive trade policies of foreign firms can be tackled. Irrigated lands have higher productivities and therefore greater emphasis should be given on expansion of the irrigation network. Enhancement in number of cocoon markets and powerlooms can be initiated with a little effort from the government. Credit facilities to sericulture artisans need to be made at discounted rates so that poor farmers can easily adapt themselves to the rising costs. Gender discrimination against women workers in wage payment has to be legally banned and rightfully implemented, which requires good governance in remote areas. Only then will the status and existence of this merely recognized, unremunerated women worker can be promoted which in turn will ensure a healthy progress in the artisanal silk industry in West Bengal.

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I take the opportunity to pay my tribute to my parents Late Mr. Tara Krishna Roy and Mrs. Jharna Roy whose wishes I always tried to fulfill and whose beliefs in my potentials remained throughout. My father's last wish was about the successful completion of this study. So, I want to dedicate this work to the memory of my beloved Dad. I want to pay my tribute to another departing soul who is my own loving sister, Late Mrs. Basanti Chakraborty whom I also lost during this phase of work.

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GLOSSARY & ABBREVIATIONS

Glossary

Bivoltine	High quality silk race, of late being practiced in India as well as in West Bengal
Charka	Type of reeling device for reeling of silk cocoons
Cottage Basin	A type of reeling device for reeling of silk cocoons
CSR	Bivoltine race hybrids which offers international grades
Ghosh Basin	A type of reeling device for reeling silk cocoons
Grainanage	A place where silkworm eggs are produced
Multiend-Reeling Machine	An improved scientific reeling device used for production of high quality silk
Multivoltine	Silk race mainly cultured in India
Nitsari	Popular multivoltine silk race cultivated in Malda district of West Bengal
Noil Silk	Blend of silk with wool, linen or cotton
Renditta	Number of cocoons required per kilograms

Abbreviations

CFCs	Chloro-flurocarbons
CSB	Central Silk Board
CSRTI	Central Sericulture Research & Training Institute
CSTRI	Central Silk Technological Research Institute
DEPB	Duty Entitlement Pass Book Scheme
DFL	Disease Free Layings
DGCIS	Directorate General of Commercial Intelligence and Statistics
EPCG	Export Promotion Capital Goods Scheme
Ha	Hectare
ISC	International Sericultural Commission
ISEPC	Indian Silk Export Promotion Council
JICA	Japanese International Cooperation Agency
KVIB	Khadi Village Industries Board
KVIC	Khadi Village Industries Commission
MFA	Multi-fibre Agreement
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MT	Metric Tonnes
PBRSSML	Paschim Banga Resham Shilpi Samabay Mahasangha Limited

CHAPTER: 1

INTRODUCTION

1.1 Introduction

Silk production, including sericulture is a highly labour and land intensive activity ideally suited for the vastly over–populated, agro-based economy like India. Throughout its vertical process of production (i.e., from silkworm rearing to production of silk goods) it spreads its welfare raising distributive impact both in rural as well as urban sector. While farmers in the rural areas practice sericulture activities, silk weaving and production of silk goods are concentrated in the urban towns and cities. Thus silk and sericulture interlink both agrarian as well as cottage based industrial economy and thereby has a wide spread distributive impact in terms of employment and income generation. Moreover, there is a substantial involvement of women in this industry and thus silk production, in a way is helpful to reduce the gender-bias in employment and income generation.

In the 10th Five Year Plan, the priorities of the Government were to generate more employment (i.e., creation of 10 million new opportunities every year) especially through emphasizing non-agricultural rural activities. Sericulture has been identified as the most suitable labour-intensive agro-based cottage industry which provides gainful employment to more than 5 million persons in the rural and semi-urban areas in India, with a sizeable number of workers belonging to the economically weaker sections of the society. At the end of the 11th Plan period, the employment generation in Indian sericulture sector has reached 7.56 millions, which was 6.12 millions during 2007-08. It has been estimated by National Productivity Council that 0.165 man year employment could be generated from 1 kg of mulberry finished products.

India has been identified by UNO as a country *self–sufficient* in production of silk, producing silk "mainly for domestic consumption", even after being largest raw-silk importer country in the world. In pre-Independence period (i.e., before 1948) silk production in India was confined within 800 tones, though the golden legacy of the pre-British era cannot be allowed to slide into oblivion. As has been noted by famous travelers and historians, sericulture industry was a prosperous industry in the Indian sub-continent during the period of the Great Moghuls. However, by the end of the 17th century when the British East India Company had established itself in India, the period of decline in silk weaving in Bengal had begun.

Sericulture became a subsidiary occupation of poor farmers during the British period, as Indian silk became one of the major stumbling blocks in the path of British Industrial Revolution and promotion of Manchester silk. The silk weavers of the then period in India were mainly hit by lack of technological know-how and low productivity of the indigenous races apart from government-level negligence and torture.

After independence attempts were made to transplant the temperate sericulture technology in the silk producing states like West Bengal and Karnataka but it failed to bring the desired result for the latter. The Central Silk Board in India established a number of sericulture research institutes throughout the country in the 1960s. With systematic efforts it became possible in 1970 to develop a technology ideally suited for this tropical country. Consequently, Indian silk production grew rapidly during 1970-1990.

In 1970, India became the fourth largest producer of raw-silk, producing only 5.6% of the world raw mulberry, far behind from Japan (50.9%), China (25.33%) and the Korean Republic (7.07%). Raw silk production in India has experienced a quantum jump in the 1990s. In 1990, the share of Indian raw silk in global production was 15.4% and in 2000 it became 18.7%. Currently, India is the second largest producer of raw silk in the world. In 2011, India is producing 17.54% of global raw silk, while China's share of production is

79.10%. The third largest silk producing country is Uzbekistan, producing 1.86% of the world's raw silk which is substantially lower than India's share.

India also possesses the distinction of producing four types of silk, namely, Mulberry, Eri, Munga and Tasar. In 2001-2002, Mulberry accounted for 91 percent, Eri 7 percent, Tasar 1.5 percent, and Munga 0.5% of the raw silk production in India. According to the recent statistical findings, India produces 23060 MT of raw silk during 2011-12, which contains 79% of mulberry raw silk, while eri contributes 13%, Tasar 7% and Muga 1%. The non-Mulberry silk varieties are called '*wild silk*' as the rearing is done outdoors. India is the only country that manufactures all the four types of commercially known varieties of silk.

However, the basic edifice of the silk-industry in India has been built on its strong home demand. The home consumption of silk products has been growing at the rate of 9.5 per cent per annum. More than 85 % of its production caters to the need of domestic demand. Indian Silk industry is mostly inward oriented and the pattern of export of silk products in India appears to be the horizontal extension of its existing industrial culture. However, domestic production has risen on an average of 3% per annum during the 1990s. According to the recent available statistics in the website of International Sericulture Commission (http ://inserco.org/en/india accessed on 25th April, 2014), domestic demand for silk in India has risen from 28079 MT to 28801 MT during 2008-09 to 2012-13, showing an average annual growth of 0.63% of demand. The domestic demand and supply gap has led the country to rely more on imported silk. However the gap in demand and supply has been declining which is reflected through its declining trend in import of silk and silk good from 9709 MT to 5122 MT during 2008-09 to 2012-13.

India is the second largest consumer of silk after USA. Besides USA and India, Japan and China are two other significant consumers of silk in the world besides European Union. In 1999-2000, India accounted for 24 percent of global silk consumption while USA consumed 31% of the total world consumption. Therefore we can say that over 50 percent of the world silk products are jointly consumed by India and USA. During 2008-09 to 2012-13, the silk production in India increased from 18370 MT to 2679, while the demand for silk rose from 28079MT to 28801 MT of silk. This excess demand gap is mitigated by imports of raw silk mainly from China.

So far as export of Indian silk is concerned, it occupies only 1.2 percent share in total Indian Exports and 4.4 % share in total textile exports of the country in 2000-01. In 2010-11, this share was further declined to 0.25 % indicating deteriorating trends and significance of Indian silk in domestic export basket compared to other commodities. According to world level statistics, India's share of export was also meager (i.e. 3.1%) despite being the second largest producer of raw silk in the world, while China's share was 14% and Korea's share was 7% in 2000-01. In 2010-11, the relative share of India's exports in silk and silk goods declined to 0.42% compared to global export of silk and silk goods. The primary reason for this lower and declining rate of penetration in the export market as explained by the Government of India was the low value items in our export basket. It is also because of the removal of quota regime under the MFA (Multi-Fiber Agreement), India becomes a non-significant supplier to the major textile importing countries like European Union (US $ 46b), US (US $ 17b), and Canada (US $ 4b). China and Brazil have managed the quota regime much better than India which reflects in their export performance. Silk export share of China and Brazil in global export volume has reached to 91.45% and 3.9% during 2010-11, leaving India as negligible range of only 0.4%. This raised few research queries which will be addressed in this research studies.

The existing literature on Indian silk industry is yet to explore adequately the lacunae of this sector in export orientation at the backdrop of its glorious history in trade scenario during colonial era. Therefore, identification of the export-depressing factors would enable the silk producing units to become successful Export Oriented Units. With the dismantling of the MFA in Jan 2005, it is important to observe the changes that the industry has undergone. Under the aegis of MFA, the principal markets of India's textile i.e., US and EU, which were so long characterized by a large degree of protectionism in the form of high tariffs or quota, has been opened to all WTO signatories. The major destinations, who although being MFA signatories impose no restrictions, are Japan, Australia and Switzerland. On the other hand, MFA has been broadly used by United States and European Union. In US textile-imports large quota users were China, Taiwan, Hong Kong, Republic of Korea, and India.

Dismantling of MFA would undoubtedly open up new opportunity for the developing nations but at the same tune it would increase the competition manifold. One of the major factors of survival in this period of stiff competition would be cost-competitiveness. The unit cost depends upon factors like prices and productivity level**.** To make the domestic textile industry more cost-effective in this post-MFA era, according to one study[1], one must emphasize on the factors like, disbursement of credit, cheaper raw materials, greater electricity availability at a cheaper rate, promotion of better capacity utilization, flexible labour-laws, easy entry-exit norms for firms, reduction in nominal rate of protection, and non-tariff barriers. Besides, there is a strong need to encourage large scale production which could help to convert the post-MFA crisis in the textile sector to an opportunity.

1.2 Statement of the Problem

India holds second position in the production of raw silk. Therefore, from the supply side, India undoubtedly enjoys few extra mileages over other nations in the world. However, India's performance in export front is not up to the mark compared to its other counterpart in the global market. Question may arise whether it is the asymmetric nature of export demand pattern and domestic type of production, which is responsible for this dismal trade performance? Or the residual production of the domestic share is not sufficient enough to grab the export market quantitatively. One thing which naturally comes out from this proposition is that domestic demand for Indian silk outweighs the foreign demand for Indian silk and the possible reasons for this can be better explained from quantitative standpoint as well as qualitative perspective.

However, the key feature of this agro-based industry is that promotion of these high end market products has the potential to uplift innumerable number of poor farmers associated with this industry through the trickle down effect of income generation. For poverty stricken economy like India, this welfare augmenting impact of silk industry cannot be undermined.

Distributive impact of the silk-industry is mainly poverty alleviating and that is the major reason why the welfare augmenting effect of the industry is so urgently felt in India. We wish to summarize them in three major heads.

a) Employment Generating Effect: Artisanal silk industry provides gainful employment to 5 million people every year in the rural and semi-urban areas of our country. In the Tenth Plan, the Government had targeted to enhance the level of employment from 5 million to 10 million per annum. The recent available statistics on employment generation reveals a boost in the level of employment from 6.12 million persons to 7.6 million persons during 2007-08 to 2012-13. This rise in the level of employment is expected to increase the level of welfare of poverty stricken rural unskilled artisans to a greater extent.

b) *Transfer of Income:* As silk is a high value item, the expansion of the market annually at the rate of 5% (Thangavelu, 2002) and with the growing population and their income level, would create a huge opportunity for the producing nations to exploit. This necessarily implies a transfer of income from the rich consumer section to the millions of poor farmers who are involved in this vertical process of production of silk starting from sericulture to the reelers, twisters, weavers and traders. Thus, among the beneficiaries a large strata of the society is involved. Since a substantial value of the final commodity is flown back to its primary produces, it is often said to be a flow down effect instead of trickle down effect.

c) Gender Promoting Impact: A considerable involvement of women is another major feature of the sericulture. The creation of job opportunities for women and enabling them in decision-making process helps the economy to minimize the gender-bias, often treated as a fall out of the development process. Sericulture helps to attain gender dominance by providing more female empowerment. Many studies indicated that 60% of the activities in the pre-cocoon and post-cocoon sectors are carried out by women. Recurring droughts / industrialization / globalization / liberalization and bountiful opportunities in the urban towns and cities perhaps attract men to migrate in search of better opportunities in the growing service sector. Women are compelled to stay back in the villages to care for the elderly people and children. Work burden due to migration of husbands and male members of the families and increased drudgery due to depletion of natural resources like ground water and biomass have an adverse effect on women's health. Sericulture activities provide a perfect choice for the women because of the very nature of the activities that can take place close to the habitations.

These are the major internal benefits that can be received from the Indian artisanal silk industry. While the purpose of the study is to identify such impacts in both quantitative and qualitative terms, it is also important to trace its link to the existing trade pattern at the back drop of its glorious past history.

Since India is a very significant importer of raw silk, the question which naturally comes up is that whether the domestic production is not sufficient enough to meet the demand challenge of silk within the domestic market? Again we wish to find out the reason behind that dependence, whether its quality related issue or its cost effective issue which leads us to hinge more towards the import.

1.3 Study Region: Malda Silk Industry

Silk industry is grossly dependent on semi-skilled artisans who are mostly engaged with this industry in specific locations, where sericulture flourishes. Malda has a long association with the history of Bengal silk, being one of the oldest settled silk-producing regions in West Bengal as well as the North-Eastern part of the country. Sericulture remains the major auxiliary activity in this region. Since the early 19th century, while Nistari silk yarn produced in Malda was customarily supplied to silk weavers in Murshidabad and Varanasi via the river-based trade, the weaving of silk clothes became a subsidiary source of livelihood in this region. Being a natural port at the confluence of the Mahananda and Kalindi rivers, Malda rose to prominence as the river port of the Hindu capital of Pandua. One time capital of Bengal, the district still maintains its tradition of earning livelihood through agriculture, sericulture and mango cultivation for its inhabitants.

Cultivation of multivoltine silk had been established in many parts of Eastern India during the late Pala Period, by which time silk had also become a major global trade commodity. Inland trade in Silk *patta bastras* was controlled from the city of Gaur, which was a major river

trading port with a large resident of weaving community, regularly visited by the merchants from distant fields like Western India. Chinese travelers during the period of Iliyas Shahi dynasty reported silk manufacture as well established in this region. The importance of the textile trade rose to its zenith with the expansion of the market after the Mughal advent in Bengal in the late 16th Century and fine muslin of superlative quality was being woven in Malda at that time. As British traders started monopolising textile trade, Malda moved from Silk-cloth weaving to weaving of reeled silk to other cloth weaving of India and England. With the growth of textile industry at Lancashire, artisanal weaving at Malda underwent decline and death, even though sericulture and the reeling of silk has remained an important activity in the Shujapur, Bakharpur, Mothabari, Gayeshbari and Shershahi areas of Kaliachack block.

Presently, it produces 6% of the national raw silk and 80% of this industry is confined within Kaliachak block. More than 19,000 acres of land in the district are occupied with mulberry cultivation and more than 60,000 families are involved with sericulture either directly or indirectly for their economic livelihood. In the year 2004-05, annual production of commercial cocoon exceeded 11,000 MT and raw silk production also exceeded 1,200 MT per annum, while silk waste was above 1,000 MT and Matka was above 100 MT per annum. The face value of the produces ranged from Rs. 110 – 112 crores of rupees per annum. The annual per capita income from this sector ranged between Rs.18000/- to Rs. 20,000/-.

1.4 Review of Related Literature

1.4.1 Studies on the Global Trade in Silk &India's Status in International Silk Trading

Giovanni Federico (1997) has examined the rapid growth of the world silk industry from the early nineteenth century to the eve of the Great Depression of the 1930s. He explained how silk industry was growing as a result of Western industrialization, which in turn brought about increased incomes that resulted into increased demand for silk products. He documented the changes in method of production and the technical progress which enabled the silk industry to cope with the new influx of demand. Italy was the traditional supplier of thread to the Western weaving industries. China, the cradle of sericulture, became a large supplier to European weavers from the 1840s and finally Japan entered into the market in 1860s. Federico (1997) also pointed out that silk indeed became the first example of a Japanese success story in the world market. Italy and China, both were losing their markets due to Japan's artisanal supply of raw silk and its adroitness in importing and adopting Western technology. Federico (ibid) recognized that Italy had retained a sizeable share of the market until its industrialization diverted labour from silk to higher wage occupations. The same misfortune took place for Japan's silk industry after the Second World War.

On the other hand, silk trade was flourished in India during the Mughal period. Nanavaty (1990) showed that silk was exported from Bengal and Kashmir by Moors to Europe during 14th – 15th Century. The British had tried to upgrade the processing of silk. Ray (1995) substantiated how the British government had promoted the wage structure for processing silk. But consequent to the abolition of monopoly trade in silk, the company wound up its silk trade since 1833, leaving it to private entrepreneurs. During the last quarter of the 19th Century, Bengal silk started to decline due to lack of proper technical know-how, husbanding authority and absence of proper organization. The first authentic enquiry into the nature of Indian silk industry was under taken by H Maxwell Lefroy and E C Ansorge during 1914-15

and following their suggestion Central Silk Board was established in India on 1949. Gopalachar (1978) indicated various functions and responsibilities of Central Silk Board, which includes organizing sericulture research and training, basic seed (egg) production and collection of statistics pertaining to sericulture and silk industry.

According to CSB's 'Compendium of Statistics of Silk Industry' (1999), artisanal silk was emphasized through development of seed organization and improvement of silk reeling during the Second Plan (1956-57 to 1960-61). A FAO Service Bulletin (1973) showed that the demand for silk during 1960 to 1970 registered a growth rate of 2.5 % per annum. The trend of the world demand can be read from the import demand of the significant consumers or the export growth of the significant producers or exporters. The leading importing country of silk fabrics in the world was US followed by Japan, whose own production failed to meet its domestic demand during this period. As we have noted earlier that in Japan, for a period of 70 years preceding the second-world war, silk used to head the list of exportable item and accounted 30 to 50 per-cent of Japan's foreign exchange earning. In course of time the focus had been shifted. Japan became a leading consumer in silk in stead of dominant supplier. After US and Japan important consumers are the converter countries, i.e., Italy, Switzerland, France, Germany and UK, who import raw silk partly for their home-use and partly for exports after processing.

Global silk industry was undergoing through a radical change in the'80s and '90s both in terms of production and in terms of consumer preference (Survey of ITC, 1998). It has affected both the demand and supply pattern of the industry over the years. The report indicates that the world silk production in many countries was either stagnant or reducing. China, the largest producer of silk experienced a drop of about 24% in its silk production. From 77900 MT in 1995 the Chinese raw silk productions plummeted to 59000 MT in 1996. On the other side, labour intensive agriculture was becoming too expensive for industrially developed countries like, Japan, Republic of Korea. They started relying more on imports to meet their domestic demand. Japan's raw silk production slipped to about a quarter from its previous level (From 6840 MT in 1998 to 1920 MT in 1997 and 557mt in 2000). The Republic of Korea's fall was even more dramatic. (From 1343 MT in 1998 to 146 MT in 1997) Silk production was declining in Brazil, too (i.e., from 1680 MT in 1990 to 1389 MT in 2000) due to its dependency on Japan. Thus market researchers foresaw that silk availability would remain limited in the days to come. According to Anterio Hyvarinen (2000), an ITC Senior Market Development Officer, millions of families in rural areas of China, Thailand, Brazil and other countries started facing the socio –economic choice whether or not to continue producing silk. As a matter of fact working with silk worm requires strict discipline learned by the tradition through generations.

Contrast to the picture as portrayed above, India had shown a consistently positive trend in production of raw silk. In 1980 its production was 4.9% of the world production. In 1990 its global production share raised to 15.42% and in 2000 the share reached to 18.71%. Despite dismal supply side performance across the globe, silk has become widely popular in the '80s and '90s. The sand-washed boom of 1980s that democratized the silk market perhaps continued to influence the market even in the later days. Another reason for this upswing could be the eco-friendly nature of silk which is also a natural fiber. Silk Review (1997) has mentioned another interesting point in this context - demand for silk in the producer country is also picking up. Japan has the highest per capita consumption of silk in the world. India consumes about 85% of its domestic production internally. The local demand is rapidly rising in China with rising living standard especially in the coastal belt. Similar is the trend in Republic of Korea and Vietnam.

However, in the post sand-washed boom era silk consumption is down in some non –silk producing countries. According to the market researchers (Anterio Hyvarinen 2000), the sand-washed boom has destroyed the luxury image of silk in the highly sophisticated market segment of the developed countries and no international campaigns were made so far addressing this issue which reflects lack of cohesiveness among suppliers, traders and buyers.

In case of India, Rajesh (2011) has shown an extending gap between demand and supply during 2000-05 by 73% while imports of silk as a percentage of production has been raised from 39% to 68%, indicating that India has neither been able to meet the increasing demand for silk in domestic market by increasing its production, nor it could exploit its export potential and instead resorted to raw silk imports to fill the excess demand gap in the domestic silk market.

Umesh et al. (2009) estimated growth functions of India's aggregate silk production and the associated trade parameters using annual data from 1984-85 to 2006-07. Their performance analysis was analysed considering both mulberry and non-mulberry silk sectors at all India level for pre-WTO period (1984-85 to 1994-95) and post-WTO period (1995-96 to 2006-07). The over all growth in production of cocoon and raw silk in India exhibited a declining trend with moderate instability. The over all performance of non-mulberry silk was encouraging as the growth rate was positive particular for Eri and Muga. This analysis documented that during 1984-85 to 2006-07, the import of silk goods was increased both in quantity and value terms. Not only that, their trade competitiveness measures also revealed that India did not possess competitiveness in the production of raw silk during the said period.

In the back drop of changing trade equations arising out of the upcoming free-trade regime, specially after the removal of Multi-Fiber Agreement from 2005 onwards, the Indian silk industry was facing the complex problems of meeting the quality silk on one hand and safe-guarding the interests of the local demand on the other. The major focus of development of silk industry in India, for long, was generating full-employment and meeting domestic demand. According to many commentators, silk production in India was chiefly identified as a highly employment oriented and low capital intensive activity ideally suited to its condition of vast labour abundant (unskilled) and agro-based economy (Sinha, 1989). This lack of orientation was plausibly the chief reason why despite being the second largest producing country, India accounted only 8% volume in the international trade of silk (Kumaresan 2002). Koshy (1993) has vividly explained about the procedures of exporting silk in India with its loopholes along with various other aspects of silk production, processing and procurement of silk.

According to a study (Kumaresan 2000), exporters in Indian silk industry have failed to make a big dent to attract the attention of the leading buyers all over the world mainly because of inadequate production of quality silk. In spite of producing at an average rate of 14,000 MT annually during 2000, the bulk of silk produced in India falls into the lower grades in terms of standard of silk (2A or below grade). Moreover, the productivity level in Indian sericulture industry is also low with reference to other major silk producers in the world, e.g., China, Japan and Brazil. The silk produced in India cannot be used in high speed looms and mill sectors. Even the domestic power loom weavers prefer imported raw silk rather than the domestic variety due to their greater and uniform quality (Naik and Babu, 1992). In this respect, EXIM Bank (2002) identifies few inhibiting factors, such as deployment of simple reeling devices, un-improved rearing environment, conventional throwing and dyeing technology etc., which obstructs the path of export promotion.

Fragmentation of domestic industrial structure and unorganized nature of the textile industry are assumed to be some other inhibiting factors in the pace of export growth of the textile

sector, as a whole (Hashim, 2005). Large numbers of small farmers fail to make a big dent on the developed market as capability of capturing the latter depends more upon quality and related factors. Since the cocoon output of an individual farmer is rather small in size and varies lot to lot in quality (denier), it is really difficult to plan for production of a given quality of raw silk in bulk. This is perhaps the reason which hindered the entry of corporate sector into the industry and thereby lowering its position in the international market of silk exports.

According to a report of UNCTAD (2002), 'silk' has registered an upward trend in the global market in spite of the prevailing general recession. In case of India, with strong domestic market demand support and expanding export trade, it was estimated that the demand for silk would shoot up from an estimated 23,300 MT in 2001 to 43200 MT by 2010 (Indian Silk, 2002) , though in real sense the demand has reached only 28,801MT in 2012-3. This eventually has thrown upon various research queries regarding the artisanal silk industry in India, which will be subsequently addressed through out the analysis of this research studies.

Table 1.1 : Indian Sericulture at a Glance

Particulars	**Unit**	**95-96**	**96-97**	**97-98**	**98-99**	**99-2000**	**2000-01**
Raw Silk Production	Tones	12,884	12,954	14,048	14,260	13,944	14,432
Production of Silk Fabrics	Million Rupees	42579.9	42764.9	51505.9	64837.8	82107.8	87480.0
Production of Silk Fabrics	Million Sq. Meter	273.29	258.12	265.4	275.88	307.43	305.52
Exports of silk goods	Million Rupees	8451.6	8764.7	9044.2	10037.6	17019.2	23758.6
Employment generation	Million	5.95	5.97	6.06	6.21	6.61	7.03
Number of reeling units	Cottage Basin	28655	28522	25648	25649	25785	25785
Handlooms	Number	227701	227701	227701	227701	227701	227701
Power looms	Number	29340	29340	29340	29340	29340	29340

Source: Central Silk Board (online)

1.4.2 Studies on Domestic Status of Silk Industry & its Distributive Impact on Income, Employment & Gender Perspective

Narasaiah (1992) has claimed that during last 30 years, India has made tremendous progress in the production of mulberry silk due to an expansionary international demand. According to that study, Indian sericulture has achieved enormous progress in evolving suitable mulberry varieties and techniques to bring about raw silkworm races suitable for tropical climatic conditions. With the evolution and introduction of more productive silkworm races, the productivity has increased and sericulture has become a highly remunerative activity to all most all states in India.

Income generation at regular intervals inspires the low skilled poor farmer-artisans to adopt sericulture along with other cultivation of crops in India. A vast literature in this specific

areas have been found in literature, where several researchers from different parts of the country derived the same conclusion, i.e., sustainable income generation capacity of sericulture always fares better than other alternative food or cash crops. Kumaresan and Prakash (2001) selected few areas of Tamilnadu to make a comparative income analysis of mulberry crops vis-à-vis other competing crops like, paddy, sugarcane, turmeric, gingelly and groundnut in that area. The crops cultivated other than mulberries are all annual crops with the life duration varying from 3 months to 12 months, while the production nature of cocoon involving mulberry cultivation and silk worm rearing, is different from that of other crops. Labour was the chief input in the production of mulberry leaf which occupies around 42 percent of the cost share in mulberry cultivation. Farm manure and fertilizers were the other major cost component in cultivation of mulberry. Labour was the prime input in silkworm rearing too. It occupies around 55% of the total rearing cost. Therefore, as a whole the share of labour cost in total leaf production and rearing activities adds up to 50 percent of the whole production. Given this situation if the labour productivity is raised, the consequences would be reflected in the rise of profitability of the artisanal income. The study also revealed 'net income' and 'benefit–cost ratios' of mulberry crops vis-à-vis other crops[2]. According to the study revenue obtained from sericulture was comparatively higher than all major crops except turmeric-sorghum / gingelly. Addition to that, mulberry-cultivation requires comparatively less area of land for farming and comparatively low graded-land is able to generate good productivity which ultimately turns into good profitability. Therefore it can be inferred that sericulture is cultivated with using more land-productive technology.

Similarly at Virbarha region in Maharashtra a study was conducted in two villages by Hajare, Jadhav et al (2008) to find out the economic viability of sericulture across other crops like paddy, soyabeen, and sunflower. The comprehensive report of their study reveals that sericulture has its edge over other crops, when flow of income generation is the consideration for sustenance of any crop[3]. Though Khobana and Dhapewada was not the traditional belt of sericulture in Maharashtra, mulberry proved its higher productivity with consistent income generating potentials. The mulberry crop efficiently utilized sub-soil moisture of deep soils in dry period and its income started after three months of plantation with optimum production from second year onwards and sustained income continued up to 15-20 years. In marginal lands with protective irrigation, farmers obtain higher returns from sericulture than other traditional crops and also generated employment for more than 170 days. Therefore productivity is not only higher in terms of greater output but also with use of inferior lands.

The beneficial outcome of this productivity led income generation flows more in favour of the farmers and artisan group whose assembly line location is much lower in this vertically integrated silk industry. According to Sinha (1989), roughly 30 percent of the value of a final silk good is added by the primary cocoon producer whose location is almost at the bottom stage of the entire silk industry. The silk processing accumulates value of 10 percent or more and 12.5 percent is accrued by the weaver leaving 22.5 percent to the printing. Thus total cost of production accrues to 75 percent while 25 percent is accrued by the traders. Thus sericulture has the potential to maneuver pro-poor growth in a developing economy.

According to another study report by Vijayakumar (Raman et al., 2007), out of total share of income distribution in the sericulture sector, 54.6 percent share is captured by primary producers like farmers, silkworm growers. Unlike other vertically integrated industry there is no trickle-down but flow-down effect in this sector. They illustrate how despite being the early staged contributor in the production process, the share capturing capacity of the farmers ameliorates the condition of the rural poor in the country. The study infers the percentage

share of income earned by the farmers, traders, reelers & twisters and weavers are 54.6, 17.8, 15.3 and 12.3 percentages respectively[4]. The average income of silkworm rearers or farmers depends upon the area of land holding, rearing of silkworms, technology adoption and available infrastructure. The study shows that they get a substantial income of Rs 15,000 to 20,000 per year, if they strictly follow the advocated technologies in time. In tropical states of the country, the silkworms are reared through out the year and the income flow will be round the year and at regular gaps. Mulberry cultivation by farmers and cocoon production by rearers create a large scale employment for family members in the rural India. Most of the times it has been found that rearers have their own filed of mulberry cultivation. However, there are also instances of non-mulberry growers taking up cocoon production alone as full time occupation (Eswarappa, 2000). They buy leaves from mulberry growers and use them as raw material for cocoon production. Therefore in their cases the income generation will be related more with labour productivity instead of land productivity.

The reeling activity involves a large semi-skilled labour force in rural or semi urban areas. The income generation opportunities emerged through this sector helps to combat the rural poverty on one hand and prevent the involuntary migration of rural people to the urban areas on the other (Gangopadhyay, 2008). Kumaresan et al. (2008) showed that in India, sericulture operations remain confined to small and medium scale farms mostly with the holdings ranging from 0.5 acres to 2 acres. The small and marginal farmers are more associated with sericulture because of its inherent labour intensive technology and the need of adequate personal care required for silkworm rearing operations. This automatically ignites the age-old debate, i.e., farm-size and productivity. It has been observed through several studies that the nature of operation makes it suitable for small farmers only, both in terms of productivity and cost efficiency. The cost of production of cocoon was more for the large farmers (Rs 100.61 / kg of cocoon) than that of small scale rearers (Rs 93.48/ kg of cocoons). Large scale farms produce less quantity of cocoons bearing almost same level of expenditure due to problems in management. As a matter of fact, the expenditure incurred on labour by the small farmers was comparatively more than that of large scale rearers. But that labour force is mostly family labours, which protects the small scale rearers against high market wage rate on one hand and make their process of production more care intensive on the other. The studies conducted by Hanumappa and Erappa (1985), Lakshman et al (1998), Kumaresan et al.(2001) also indicated more involvement of family labour. High returns to family labour and efficient management in silkworm rearing are the key aspects of success for small-scale Sericulturists. Small-scale silkworm rearers obtain better yield and thereby obtained higher revenue from sale of cocoons and generation of by-products than their larger counterpart.

Analyzing the cost inefficiency factors of the Large Scale Rearers, it has been found that cost intensive inputs such as farmyard manure and fertilizers escalate the cost price of the large scale operators. Dependence of hired labour and higher market wage rate also act as a stimulating factor for cost acceleration. From the decomposition analysis of cocoon production, it has been found (Kumaresan et al., 2008) that the income gap between large scale rearers and small scale rearers with respect to cocoon production was attributed to technology difference and management practices. This means the small-scale farmers adopt better technique of production. Moreover, small scale rearers normally rear silkworm in small or medium sized rearing houses in which adjustment of temperature and humidity can be easily controlled. Again with the help of family labour, the small farmers could provide timely feed for silkworm and maintain hygiene in silkworm rearing. This has also been evidenced when deviation in rearing practices due to non-availability of labour or work pressure adversely affect the yield performance. Kumaresan et al. (2008) has shown that

despite earning lower profit compared to its smaller counterpart, the large farm remains economically viable only due to its favourable cost-benefit ratio (1:1.48).

Dhane and Dhane (2004) explained the income generation process of the silkworm rearers, are threatened by some significant supply-side constraints, which includes several types of inefficiency starting from technological inefficiency, cost inefficiency, labour inefficiency and market inefficiency(including both product market and factor market) like (i) inadequate availability of silkworm rearing equipment; (ii) high cost of construction of rearing houses; (iii) expensive rearing appliances and materials; (iv) knowledge constraint specially in respect of adoption of new technology; (v) constraints regarding marketing of cocoons, (vi) lack of credit facilities for construction of rearing room; (vii) unavailability of subsidy for rearing silkworm; (viii) difficulties in identifying diseases of silkworm; (ix) lack of protection facilities of silkworm from diseases; Their study also reveals that caste and social participation of the respondents have a highly significant relationship, while knowledge of the farmers have significant relationship with constraint faced by them in sericulture. The other characters such as sericulturist's age, education, family size, available family labour, land holding, irrigated land, and experience in sericulture and information source did not have any statistically significant relationship with the constraint faced by them in sericulture.

According to Dhane and Dhane (2004), there also exists some conventional reservation among the farmers that acts as the barriers in the path of income generation. Large farmers irrespective of their size of holding keep their irrigated fertile land for food-crops. Only marginal and reclaimed land was taken up under mulberry in the initial stage. Cattle grazing have been found to be one of the important difficulties in sericulture. Indian tribal and cattle grazing farmers confine their cattle only in the rainy season. After the harvest season they loose their cattle, which pose menace to mulberry plantation. Besides the relative low productivity of cultivable land the large farmers also face above type of externality issues within their own group which inhibits their income growth in sericulture and reinforces the inverse relation between 'farm size and productivity'.

Eswarappa (2000) has shown another dimension of labour productivity which is responsible for the income generation in sericulture in the villages of Andhra Pradesh where the traditional occupational patterns in the villages have been dismantled. Caste hierarchy has been demolished by the lower caste as sericulture has brought all the groups in a level playing ground to compete with each other. This is a new dimension of labour productivity growth which helped in generating income growth in sericulture. However, he has also mentioned that regarding the utilization of benefits, upper caste people still maintain their traditional advantage over education.

Narasaiah (1992) examines in details the growth of sericulture in India with special reference to Anantapur District in Andhra Pradesh. He points out that sericulture which is an agro-based cottage industry fits well in the perspective of rural infrastructure. He also explains strengths and weaknesses of sericulture operations with some practical suggestions to overcome various current problems and hindrances of industry to ensure overall development. Ramana (1987) give a picture of artisanal silk in India covering both on farm and off farm activities. He intricately analysed the benefits of sericulture bringing out its importance in terms of income and employment generation.

In fact, the Statistics Biennial (CSB, 1986) also shows the employment generation in sericulture was lifted to 51.52 lakh persons in 1985-86, which was a quantam jump of employment opportunities in Indian sericulture from 16 lakh persons in the year 1979-80. The comprehensive and continuous employment statistics, which is available from the period of 95-96 onwards, shows a positive upward trend. In the year 2006-2007, it reached a peak of 60.03lakh persons among whom 47 lakh persons are sericulture farmers and rest 13lakhs are from off-farm sector (like, reeling, twisting, weaving etc.) This evidenced that sericulture generates more farm employment than non-farm employment.

Rajpurohit and Gobindraju (1981) narrated sericulture as a tool which helps to increase employment opportunities in the economy. The employment and yield potential of the economy was reinforced by the fact that most of the silk production is of menial in nature and are all in informal sector. For this reason, about 90 percent of their labour employment either goes to landless rural people or to marginal farming families that hire out their labour, or to the sericulture families (Sinha, 1989).

According to another survey conducted by CSRTI, Mysore (Benchamin et al., 1987), sericulture provides direct employment of 19 lakh persons in the year 1985-86, out of which 11 lakh mandays were devoted to sericulture and another 8 lakh mandays to post-cocoon process. Indirect employment, according to that study, amounts to one-third direct employment so that 25 lakh persons could be devoted around these artisanal silk industries along with its ancillary activities[5].

Table 1. 2: Performances of Artisanal Silk Industry in India (1979- 2007)

Year	Employment (man days) (Lakh persons)	Production of Raw Silk (MT)	Area of Cultivation (in lakh hectare)
1979-80	16.00	4193	1.55
1985-86	51.52	7029	2.17
1995-96	50.50	12884	2.86
1996-97	50.70	12954	2.80
1997-98	53.00	14048	2.82
1998-99	53.50	14260	2.70
1999-00	53.50	13944	2.27
2000-01	54.00	14432	2.15
2001-02	55.00	15842	2.32
2002-03	56.00	14617	1.94
2003-04	56.50	13970	1.85
2004-05	58.00	14620	1.72
2005-06	59.50	15445	1.79
2006-07	60.03	16525	1.91

Source: CSB, 2003

From the employment statistics, it is clearly revealing that area of cultivation has started showing a declining trend from the mid of ‘90s while increase in land productivity (perhaps due to irrigation or other technical innovations) have kept the output at its positive trend path. Employment generation has shown a positive spurt through out 1995-96 to 2006-07. The output elasticity of employment has mostly shown positive trend besides few aberration. This indicates as the percentage of employment rises, the percentage of output level also rises, but the value was never greater than one.

Hanumanappa & Erappa (1985) has shown how the employment and income generating potential of silk industry diverges between traditional and non-traditional areas due to differing costs of mulberry leaf production and rearing of silk worms. Their analysis on silk reeling employment also reveals that dependence of family labour increased both in traditional and non-traditional belt in production. The demand for hired labour shows a declining trend in non-traditional region, while in traditional region it shows a marginal increase. On the other hand, the scope of hired employment opportunities expanded in the farm level outdoor activities of both the regions.

Employment opportunities have also been estimated by several researchers and field surveyors comparing the employment opportunities generated by alternative crops. Activity wise cross-section analysis shows that sericulture opens up several channels of work-employability like, garden establishment, leaf production, silkworm rearing, and marketing of cocoon. Mulberry cultivation and silkworm rearing are conducted round the year. It is usually observed that five to six crops can be cultivated from one acre of mulberry gardening every year. On the other hand many agricultural crops like paddy, sugar cane, turmeric and banana are planted and harvested once in a year and therefore could provide limited employment opportunities compared to sericulture. Usha Rani (2007) has also made a brief account of comparison of labour involvement in sericulture and other activities/ crops. It has been observed that sericulture activity is generating an average of 481 mandays per annum while Milk/ Dairying(another common occupation for the low skilled labour) generates 217 mandays, followed by Paddy (153 mandays), Groundnut (135 mandays), Ragi (110mandays).

Vijaykumar et al. (2007) estimated that 1 ha of mulberry creates employment of 13-16 persons per year. Thus a location specific analysis indicates that for a production of 1 kg of raw silk 11 mandays are required which can again employ 30 mandays for production of silk fabric. According to Rama Lakshmi C.S. (2007), the Sericulture Commissioner, Andhra Pradesh, sericulture is a labour intensive industry in all its phases. It can generate employment up to 11 persons for every kg of raw silk produced. Out of which more than 6 persons are women. More than 60.00 lakh persons are employed as full time workers in the production chain out of which 35-40 lakh persons are women. Ever increasing demand to meet the domestic handloom industry requirements provide tremendous opportunities for the women to avail sustainable income generating activities.

However, from the current statistics (Annual Report, 2009-10), it has been observed that 16322 metric tones of raw silk is being produced by 68.17 lakh persons in India, which on average indicates 1 kg of raw silk can generate employment of 0.41 persons. This reveals existence of heterogeneous nature of states which pulls back the average level of national performance. Gangopadhyay (2008), in his review of Sericulture Industry in India has classified the employment generation pattern of the industry into two major types:

(i) Direct Employment
(a) Mulberry Cultivation;
(b) Leaf Harvesting;
(c) Silk Worm Rearing;

(ii) Indirect Employment
(a) Reeling;
(b) Twisting;
(c) Weaving;
(d) Printing & Dyeing;
(e) Finishing;
(f) Silk Waste Processing;

A model chart of Activity Wise Employment Generation which is very relevant to our present analysis is depicted below:

Table 1.3: Activity-wise Employment Generation in Mulberry Sericulture (per ha)

Activity	Man –days	Man Years
A. Mulberry Cultivation & Silkworm rearing		
a) Mulberry Cultivation	585	
b) Leaf/ Shoot harvesting	320	
c) Silkworm rearing	350	
Sub Total	1255 (19.5%)	5.020
B. Reeling of Silk Cocoon (@300mandays per 1000kg of reeling cocoons)	2250(34.9%)	9.120
TOTAL (A+B)	3535 (54.9%)	14.140
C. Twisting (@ 220gm of silk per man days)	432 (6.7%)	1.727
D. Weaving		
Handloom (@0.13kg/md)	438 (6.8%)	1.752
Powerloom (@0.31kg/md)	122(1.9%)	0.42
Sub Total	560	2.238
E. Printing & Dyeing (@40 man days for 40kg of raw silk)	95 (1.4%)	0.380
F. Finishing (@ 751 man days /40 kg of raw silk)	1784 (27.7%)	7.135
G. Silk Waste Processing (@18.775 man days per	26	0.104

kg of raw silk)		
Total (C+G)	2896	11.58
Grand Total	6431	26

Source: Central Silk Board, Bangalore , Gangopadhyay (2008) : Silk Industry in India _ A Review, Indian Science & Technology (online)

Usha Rani (2007) has shown that 96.36 mandays of employment is generated for the establishment of 1 acre of mulberry garden for rearing 300 dfls of silkworms in two months. She has also shown the female dominance in almost all work activities. Prabha Shekhar and Ravi Kumar (1988) also said that if rural households are to be made economically viable self sustaining units, the employment and income generation by rural women need to be given utmost priority.

Banerjee (1990) justified the reason of female dominance in sericulture by stating that silkworm rearing calls for intensive attention as well as mother's care, especially during the later stage pf larva. Identification of mature silkworms for putting in spinning trays requires a great deal of expertise skill and intensive labour. Moreover, there is hardly any time specificity of this round the clock activity with intervals. These beget problems of getting hired labour and dependence of family labour increases. These are the reasons why female dominance in sericulture is so much prevalent in sericulture. M. Prabha Sekhar and C. Ravikumar (1998) state that in order to make the rural households economically viable self-sustaining units, the employment and income generation by rural women need to be given utmost priority. Studies conducted at Institute of Social & Economic Change (ISEC) Bangalore, by Acharya et al. under the Beneficiary Assessment Program of National Sericulture Project (1989-96) have addressed the women issues and come out with some meaningful measures. Some of the main issues addressed were a). Access to land, credit and other family assets through formation of working group, b). Technical awareness and skill development enlisting women oriented technologies, c). Access to credit to women group, d). Access to marketing and awareness to make women sericulturists more reliant.

Kirsur et al. (2007) remarked that although the NSP period (1989-96) witnessed commendable initiations in the form of implementing exclusive programs for women and intermittent interventions during the subsequent plan periods, the programs were not aimed for a sustainable development on consistent basis. There was no target set for women participation as such and in the absence of any governance and monitoring mechanism the women development could not attain to devise a frame work of equitable and sustainable development on constant basis. Kirsur et al. (2007) inferred that the need is to move from integrating women into existing development approaches, providing them with a framework of equitable and sustainable development. The issue is not merely 'adding on' women to various programs but of reshaping these processes to create the space for women's involvement in decision making procedures, too. Women in sericulture were rather neglected as their contributions were never recognized and wage inequalities between a male and female hired worker were never removed through affirmative actions. The root cause of all these problems lies in gender bias of this patriarch society. Patriarch society always makes women powerless in several ways – by convincing them of their own inferiority compared to their male counterpart, by demanding that they conform to certain stereotyped appropriate roles and behaviours, by denying their control over their own lives and labour, by limiting their access to resources and by restricting their opportunities to participate in decision making. The development efforts especially in artisanal silk sector during the years of 1989-96 failed to address specifically on women empowerment issues. Rather those addressed over

the subordination and gender bias issues. Most of the main stream approach have not been based on dynamic role of women workers including the household and hired women, but tried to focus on their roles like mother, housewife which is no way connected to their empowerment in true sense.

1.4.3 Studies on Sericulture & Silk Industry of West Bengal

The eastern region of India contributes 10% of the total country's production. Considering these facts, silk industry in this region needs to be viewed not only as a tool of employment generation and poverty alleviation but also as export oriented sector. West Bengal is the largest silk producing state in this region with some organized development of the industry. Sericulture in the rest of the region has spread thinly and widely with many families practicing sericulture but with very little rearing capacity. The soils, climate, social, cultural and economical conditions vary from place to place to a great extent. Even within a region the climate changes rapidly from season to season. Therefore a total region based approach of development should cover all most all of these problems. Eastern Region has a rich heritage of making exclusive design making on fabrics, which needs to be encouraged through development of the local artisans (Saratchandra 2000).

Literary evidence points out the Eastern region specially Bengal as being the main sources of indigeneous silk , though Kashmir was better suited climatically to silk production than Bengal.(Varadarajan, 1988). Bodos in Assam have traditionally been associated with silk weaving. According to Suniti Kumar Chatterjee, the original home of Bodos may have been the Sikiang region in China.In centuries prior to the Chritian era they had moved to Bengal. They were referred to as Kirata in Sanskrit literature.In the absence of of organized sericulture in India, the Bodos might have provided a fillip to the development of wild silk in Eastern and North eastern India.

According to many famous travelers and historians sericulture industry in Bengal during the period of Great Moghuls was a prosperous industry. At the end of the 17th century when the British East India Company established itself in India, the period of decline of silk weaving in Bengal began. The Company assuming the Dewany of Bengal Presidency introduced new feature in the silk export policy which manifested in the increase of raw silk at the cost of silk manufactures. Submitting to the interest of the British textile industrialists this was consciously engineered so as to meet the big potential increase in the demand for raw silk in Great Britain (created mainly due to the introduction of power driven machines), to protect its own manufactured silk products from competition and to capture the entire market for textile products in Bengal. In pursuing this interest the Company undertook various measures to destroy the silk weaving industry in India, and particularly in Bengal. In many cases the Company people went to the extent of forcibly chopping off the thumbs (the finger which is one of the most essential organs in hand weaving) of the weavers. Consequently, during the British rule over India, mulberry as a cash crop resorted to a much less important position in comparison to indigo, tea or opium.

However, increase in export of raw silk necessitated enhanced mulberry cultivation as well as quality improvement of raw silk. Thus, all the subsequent measures taken by the British Raj for the development of sericulture and silk sector were directed towards this. In comparison to the efforts and supports necessary to rejuvenate the sericulture sector of Bengal, these attempts were inadequate and could not bring tangible results. Moreover, the general policy thrust of the colonial power was in contradiction to the greater interest of the growers, sector as well as the country. With the growth of textile industry at Lancashire, artisanal weaving in

Bengal underwent decline and death. However, despite all these odds, Kaliyachak block in Malda district in West Bengal remained occupied with sericulture and the reeling of silk as the major economic activity of its inhabitants (HDR Malda, 2006).

Comparatively less significant research work has been done regarding income generation issues of sericulture in West Bengal. Mookherjee (1992) has done a geographical analysis in her book 'Sericulture in West Bengal: A Geographical Analysis'. She vividly sketched role of sericulture in state of West Bengal in the back ground of the land-tenure system in the state. Ali et al. (2008) have worked over the mulberry cultivation pattern of Malda district in West Bengal and revealed a grimy picture. They have commented that technological inefficiency has blocked the income generation growth in sericulture, where scarcities of underground water and unpredictable rainfall have enhanced the problem for mulberry cultivation. The quantity and quality of mulberry leaves produced by the majority of the farmers in the district remains sub-standard. They commented that productivity led growth is possible through introduction of high yielding varieties, application of fertilizers and irrigation. De Sarkar et.al. (2013) have shown how sericulture can be used as a tool for economic development in Malda district. They estimated the income generation through silk reeling in Malda district during 2008, 2009 and 2010 was Rs.11.16 crore, Rs. 14.80 crore and Rs. 24.08 crore respectively. Thus income generation has almost been doubled through sericulture in Malda district.

1.5 Research Gap

Although artisanal silk industry has a vast national level literature and the case studies, but major part of those analysis done so far were concentrated on Karnataka, Andhra Pradesh and Tamil Nadu. Compared to these three traditional silk producing states very little literature has been found on the West Bengal's artisanal silk industry. At the back drop of its rich historical milieu how this artisanal industry decayed over the passage of time and how it did resurrect into new form needs to be studied chronologically. There also exists a void regarding the analysis of the current problems faced by the artisans of West Bengal on the issues of income earning, employment generation and gender perspective of sericulture and silk industry in West Bengal.

1.6 Objectives of the Study

The research design has been framed in such a manner so that the aforesaid research gap can be accurately addressed. This research study intends to fulfill twin major objectives. The first objective is to portray the historical genesis of silk industry across the globe along with its development in India. Bengal silk was famous by its name not only within local hub but also at far abroad. The Dutch and the English traders started trading Bengal silk by exporting them to European market. This golden history needs to be unraveled before stating the current problems of the industry. The export pattern of Bengal silk needs to be analyzed from the colonial era. The evolution of the artisanal silk industry in India should be narrated and justified reasons are to be investigated regarding the failure of the industry in the present day's export frontier. This issue would drive the research design especially on the post MFA phase where quota restriction made by the developed countries was withdrawn. In this context, the study will also attempt to derive the domestic production response in relation to the export pattern.

The second objective of this study is to analyze the performance and current problems of artisanal silk production among the poor farmer cum artisans of the rural economy of West

Bengal. This focal theme will be narrated on the basis of the (i) Income earning Issues, (ii) Employment Generation aspects and (iii) Gender promotional role of the silk industry in West Bengal. The study will be mostly hinged on mulberry silk as the production share of this silk is 79.04 per cent in India (CSB, 2014).

Observations made in literature state that the Indian silk industry is not sufficiently technology driven and is mainly domestic demand based. However, it is also noted that India also imports silk pointing to external dependence of the industry. In this context, analysis on the basis of size of the firms is necessary which may have an influence on the export pattern as well as export performance of the silk industry. It is observed that the large firms are successful in deriving all kinds of benefits (like, credit facilities etc) and technologies are also not scale neutral. These mark the reasons for innumerable poor farmers who fail to take the advantage of any kind of institutional interventions in the market. This in turn perpetuates the poverty scenario in the rural areas concentrating on sericulture. Thus research analysis would also attempt to arrive at plausible solutions and explore meaningful strategies to meet the challenge faced by the domestic silk farms.

The current problems of the silk farmers and artisans in the state of West Bengal need to be categorically explained with some recommendations of policy restructuring. Artisanal silk sector uplifts income level of those poor marginal sections who belong to either backward or minority communities of this district. It also includes the women workers who are also ignored in this patriarch social periphery. This research study has the objective to throw some lights on those issues very emphatically.

1.7 Research Questions

The specific research questions which the research intends to clarify are provided below:a

a) How the silk industry was invented in the world and how the manufacturing technique is reached in India and specifically in West Bengal?

b) How the artisanal silk Industry progressed in West Bengal along the time scale of history?

c) What is the present status of the artisanal silk industry in India against the global perspective?

b) How the productivity parameters help the artisanal silk industry to attain its growth pace in India? Are there any regional inequalities in productivities?

c) What is the impact of globalization on the silk industry? Effect of Globalization has been perceived by more or less all the sectors in the economy and the silk industry is also not an exception.

d) What is the impact of China’s participation in WTO over Indian artisanal silk industry?

e) What is the impact of quota removal by the developed country with MFA abolition on India’s silk trade?

f) What are the current problems of the industry? How does the transfer of income take place from high-end urban consumers to the rural artisans and labour?

e) How does income generation take place along with rise in production in sericulture as well as the silk industry? What are the major impediments in the path of income generation in artisanal silk industry?

f) Sericulture is a purely rural based agro-industrial activity. It raises the job opportunity of the rural mass in the agro-sector and thus stops the rural-urban migration propensity within the rural workforce. The research question would be to determine those determinants which

raises this level of employment in West Bengal and what are the problems faced by he silk farmers and artisan household in employing these family as well as hired labour?

h) Sericulture helps to attain gender dominance by providing more female employment but whether that employment dominance is translated in empowerment is a big question which will be addressed in this research study. Many studies indicated that 60% of the activities in the pre-cocoon and post-cocoon sectors are carried out by women. Recurring droughts / industrialization / globalization / liberalization and bountiful opportunities in the urban towns and cities perhaps attract men to migrate in search of better opportunities in the growing service sector. Women are compelled to stay back in the villages to care for the elderly people and children. Work burden due to migration of husbands and male members of the families and increased drudgery due to depletion of natural resources like ground water and biomass have an adverse effect on women's health. Sericulture activities provide a perfect choice for the women because of the very nature of the activities that can take place close to the habitations. The lower spectrum activities in the artisanal silk industry are mostly carried on by the marginal and landless people of the rural areas in West Bengal. Women dominance further signifies concentration of more marginal people in this trait. Whether success of artisanal silk actually depends on the exploitation of these marginal class people or their dominance is work activities ultimately leads to their empowerment will be a major research query.

1.8 Research Hypotheses:

The major research hypotheses which will be pursued are summarized below:

i) History & Genesis of silk production in China, Japan and India were influenced by the global trade demand which mostly generated from European countries.

ii) Having the supply-side advantage, the silk industry in India fares strongly against global competition.

iii) Despite being second largest producer of raw silk during the past few decades India's export trend reveals a depressing scenario.

iv) Growth Indian artisanal silk industry is constrained by regional inequality.

v) The abolition of MFA has made the artisanal silk industry more vulnerable to its international competitor China.

vi) Silk industry aids in income generation across the rural mass. This hypothesis has to be tested from the micro-economic frame work. Since Malda district in West Bengal has been chosen for carrying out the micro-survey and primary data collection, the hypothesis will be tested on the basis of the average annual income generation by the farmers and artisans of this artisanal silk sector.

vii) Income generation is secure enough for the rural family and they do not need to depend on any supplementary income generating activities. There is seasonality involved with this income generation.

viii) Employment generation by this sector has been increasing over the years, although a decling trend in the numbers of sericulture workers have been observed in West Bengal during 2002-03 to 2010-11.

ix) Social security provided by the silk industry, in terms of employment and income is adequate. In case it fails to provide that security there is a high chance of switch over to other lucrative cash crop cultivation.

x) The silk industry promotes gender equality by reducing gender wage differentials and increasing income earning opportunity to women workers.

xi) The apparent female workers domination in sericulture activities are translated to women empowerment through improving their power relation within household.

1.9 Research Methodology

Multiple regressions through Ordinary Least Square Methods will be usually applied to the proposed econometric models based on the research hypothesis. To handle the operation we will use SPSS software package. Kaliyachak-I and Kaliyachak-II are those specific blocks in Malda district where predominance of sericulture activities have been observed in silk worm rearing and reeling. Silk weaving is very rarely found in the district though artisanal silk involves their value addition too. Therefore in our primary survey it has been decided that around 200 household from rearing, reeling and weaving activities will be chosen.

A priori information tells us that KaliachakI & II blocks have dense population on sericulture farmers and artisans. Using stratified random sampling eight villages were chosen from these blocks, namely *Gayes Bari, Sujapur, Mothabari, Marupur, Alipur, Sershahi, Feranchak, Jotkabil.* Thus primary survey of these two areas will be undertaken. Selection of farmers will follow the usual random sampling procedure while care would be taken to ensure maximum coverage of these areas. Twenty five to thirty households involved with sericulture activities have been chosen from each village using stratified random sampling. In addition, interviews of workers in different activities of sericulture and silk processing will be undertaken so that the socioeconomic background of all categories of workers can be studied. Silk industry including sericulture is a vertically integrated industry which normally involves value addition by the successive sectors as follows:

1). Mulberry cultivation and Cocoon producing sector (30.4% value addition); 2). Reeling Sector (7% value addition); 3). Twisting Sector (3.6% value addition); 4). Weaving of Silk Fabrics (12.5%value addition); 5). Printing of Silk Fabrics (21.7% value addition); 6).Manufacturing of Readymade Garments, Carpets etc, & Trading (24.8% value addition). Thus instead of being concentrated to a particular rich farm, the generated gross income is disseminated across different cottage based sectors of the agrarian economy where the share of value addition is significant in the first and last two sub sectors. Primary information would thus be collected from all section of workers performing such activities in the villages of Malda.

1.9.1 Data Set

At the macro level, secondary data will be compiled from Central Silk Board (both published and on line data), silk sector study by Export Import Bank of India, Online Data published by Ministry of Textiles of India, UN Commodity based Statistics data, Online data and information provided by International Sericulture Commission, Online data and information provided by Directorate of Sericulture, Govt. of West Bengal as well as the other state governments of traditional silk producing states like, Karnataka, Tamil Nadu, Andhra Pradesh and Jammu & Kashmir.

Primary data will be collected from the field survey on the randomly chosen household from the villages chosen in Kaliyachak I & II blocks of Malda district. The office of Deputy Reeling, Government of India in Malda district will also be a plausible data source

1.10 Plan of Study

As it has already been noted, the study has triptych objectives and the research work will be proceed along with that desired goal. The initial objective is to substantiate the genesis of artisanal silk industry in Bengal at the backdrop of global genesis of sericulture and silk manufacturing technology. Bengal silk bears a glorious heritage which will be intricately analysed in perspective of changing political situation of the country as a whole. Bengal silk had a contributory role in global silk trade and Dutch and British merchants have significant role in exporting the silk in European market. Plan of this research work is to include and enlighten all those issues in the second chapter of this research study. The next objective highlights about the performances of this artisanal industry and before delving into the focal state West Bengal, the national level performance was considered as integrated part of the research analysis. Review of the existing literature help us to have an idea about the income generating factors and employment generating determinants in the artisanal silk sector in India. This idea would help us to form few models based on some hypothesis. The available secondary data will help us to test those hypotheses. The third and last objective is to locate the current problems of the artisanal silk Industry of West Bengal. The filed level survey work in the sericulture rich villages of West Bengal will help us to identify those problems. In addition to our tested result this analysis would include some regional flavour to make a situational analysis of silk artisans in West Bengal. The plan of our study can be interpreted through the chapterisations too.

1.11 Chapterisations:

Chapter 1. Introduction

Statement of problems & prioritization of the issue, Objective of study, Study region, Review of related Literature, Research gap to be addressed in thesis, Research questions & hypothesis, Research methodologies, Plan of study

Chapter 2. Origin, Manufacture & Trade in Silk

Introduction , Spread of silk from China, Trade via silk route, Trade via silk road, Genesis of sericulture in silk-trade driven countries of world, Asian countries (Japan, Korea, Thailand, India, Vietnam), European Countries (Italy, France, England), Latin American Countries, Conclusion

Chapter 3. Origin & Genesis of Artisanal Silk Industry in India (With special reference to Bengal Silk)

Historical origin of silk manufacture in India, Silk trade in pre-colonial era, Problems faced by silk artisans of Bengal during colonial era (1612-1820), East India Company's policy for artisanal silk Sector, History of Indian artisanal silk industry during British Raj1820-1947, Silk production &tTrade in Bengal & Kashmir, Export trends of Indian silk vis-à-vis global trends, Socio-economic status of silk artisans in colonial India, Conclusion

Chapter 4. Indian Silk Industry after Independence (1947-1990)

Establishment of Sericulture Board, Varieties of silk cultivation (Mulberry, *Eri, Tasar, Muga*), Procedures of silk manufacturing, Performance of silk producing states during 1947-90- Traditional Vs. non- traditional states, Silk Manufactures in Different Traditional States –Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal, Silk production in non-traditional silk producing states, Conclusion

Chapter 5. Performance of Artisanal Silk in Post Liberalised Period (1990-2010)

Location of Indian silk in post liberalised period (Production & Trade based), Problems faced by artisanal sectors in the globalised regime, Problems faced by Indian silk artisans after China's joining in WTO, Consequence of Multi Fiber Agreement (MFA) in artisanal sector, Policy formulations , Regional inequality with trade openness, Conclusion

Chapter 6. Problems & Performance of Artisanal Silk Industry in West Bengal

Status of West Bengal in production & trade, Performance West Bengal artisanal silk Industry in planning periods, Productivity comparisons with other traditional states, Problems faced by silk artisans of West Bengal (Production Chain Analysis), Income generating issues, Employment generating issues, Gender involvement, District level Analysis : Malda, Murshidabad, Birbhum, Conclusion

Chapter 7. An Empirical Analysis on Income & Employment Generating Issues in Rural Artisanal Silk Industry (A Case Study in Malda District)

Introduction, Income generation trends in Indian sericulture in pre & post periods of globalization (1983-2011), Employment generation model building in national perspective : a. Employment boosting model, b. Cross-section model of Employment generation, Artisanal silk industry in Malda district: a. Econometric model building on income generation aspect : b. Employment generation model building, Conclusion

Chapter 8: Situational Analysis of Women Workers & their Employment in Artisanal Silk Industry of West Bengal

Introduction, Family dynamics in sericulture households, Issues of child labour in artisanal silk sector. Women workers in artisanal silk sector, Involvement of women workers in sericulture, A case study in Malda district, Construction of women empowerment index in sericulture, Conclusion

Chapter 9: Summary & Conclusion

Summary of research findings, Policy recommendations & way ahead

1.12 Limitation of the Study

The study will be done focusing on mulberry silk industry, as it captures the major part of silk production both in state of West Bengal as well as nation. Non-mulberry silk is alternatively known as Vanya silk and Cooch Behar district in West Bengal has the tradition of producing *tasar* and *muga* silk. Our research analysis has included sericulture rich villages of Malda district only as Malda is the largest mulberry silk producing district in West Bengal. Gender

analysis has also been done with limited vision emphasizing on the economic aspect of the women labour both within household and hired. The gender power relation within the household is beyond the scope of this study though few of its areas will be highlighted with that limited vision. Despite these restrictive approaches, this research work will surely cover a vast part of the present status of silk artisans in West Bengal at the backdrop of its glorious heritages and future challenges and would presumably add some substantial value in the literature.

Notes

1. See Hashim, D.A. (2005) : Post MFA - Making the Textile and Garment Industry Competitive, Economic and Political Weekly, Vol. XL (2), pp 117-127.
2. See Kumaresan et al, (2001) Comparative Economics of Sericulture with competing crops in Erode district of Tamil Nadu, *Indian J. Sericulture*, Vol40, No2, P-142-146
3. See Hajare et al, (2008) *Indian Silk*, Vol 46, No 9, January 2008
4. See Anantha Raman et al , (2007) Feasibility of Human Resource Development for Sericulture in India- A Review, International Conference on Sericulture Challenges in 21st Century, Sept 2007, Vratza, Bulgaria
5. Benchamin et al (1987) Employment Generation and Income Generation in Rural Areas through Sericulture, *Indian Silk,* XXV (June)

CHAPTER: 2

SILK: ORIGIN, MANUFACTURE

& TRADE

2.1 Introduction

The discovery of silk tissue bears an interesting history. Historical evidence confirms that silk was discovered earliest in China (Matsui, 1930; Fan and Jin, 1933) and from there the industry spread to different parts of the world. From its birthplace in China to its ultimate destination at Rome, it passed through Tashkent, Bagdad, Damascus, Istanbul, before reaching European shores. Silk has been the most colourful item in the world's caravan through its overland route (named as 'Silk Road' later), since the beginning of the Christian era. The Silk Road was originally opened by Zhang Qian, the Diplomatic Envoy of Chinese Emperor WuDi. (the seventh Emperor of Han Dynasty) in around 139BC. Through this extensively elongated (6400km) Road, not only the magnificent and fabulous excretion of *Bombyx mori*[1] (silkworm) was carried to Rome, but a lot of other commodities were also carried through this path[2]. Silk Road was actually a bridge of commodity and cultural exchange between the East and the West of World. However, the Romans only knew the use of this exquisite silk , but not the secret of its manufacture. They believed that silk grew in mulberry trees and could be obtained directly from the leaves with the help of water (Bernstein, 2008). The Chinese could actually keep the procedure of manufacturing silk hidden from the rest of the world till 300AD, though there lies a lot of controversy regarding this issue. As a matter of fact, from the hair of a Twenty first Dynasty Egyptian female Mummy (around 1000 BC) and again from Germany and Scotland tombs, silk has been found (Lubec et.al., 1993). All these indicate that the trade connection between China (the principal originator of silk) and Europe was well established even in Pre Han Period.

However, contrary to the Western historians, genesis of sericulture in India dates back to antiquity (Ma, 1998). Literary sources (Epic and Purana) mentioned the production of silk around 1300-1400BC in India (Federico, 1997). But, according to Federico (1997), that was probably the indigenous silk (*tussah* silk) [3] and not that of *Bombyx Mori (*i.e., mulberry silkworm*).* The cultivation of silk mulberry and practice of sericulture had started in the Ganga- Brambhaputra peninsula as Mookerjee N.G. (1719) claimed in his book 'Genesis of Silk Worm' and that sericulture originated somewhere at the foothills of Himalayas (Krishnamurthy, 2002; Dutta and Nanavaty, 2007).

The popular Chinese legend confers the title of "Goddess of Silk" to Lady Hsi- Ling- Shih, wife of Yellow Emperor, for discovering silk and silk loom and for introduction of silk production in China. According to the great Chinese Philosopher Confucius, on a beautiful morning of around 2640 BC, when the Chinese Queen was enjoying her morning tea sitting under a mulberry tree, a silk cocoon dropped in her cup of hot tea. With all her excitement, she noticed how the delicate fibers started unraveling itself. With her honest efforts, silk-filament was manufactured and silk weaving started in China. The earliest authentic reference to silk was found in the Chronicles of Chou-King (2200BC), where silk figured prominently in public ceremonies as a symbol of homage to emperors. The first archeological evidence dates back to sometime between 2850 and 2650 BC in Northern China, although very little is known about the first phases of the history of silk industry (Federico, 1997). Behera (2002) points out that archeological excavation of silk clothes, girdles and yarns in the Chinese province of Zhejian proved that the silkworm breeding and cloth weaving had been developed in this region nearly 5000 years ago.

The Chinese kept the secrecy of producing silk from the rest of the world for thirty centuries. Foreign travelers were searched thoroughly at border crossings and any one caught trying to smuggle eggs, cocoons or silk worms out of the country were summarily executed.

Gradually, China began to export silk-wares and demand for this exotic fabric created the lucrative trade route. Silk Road had perhaps reshaped the socio-economic pattern of many countries through exchanges of this item in a magnificent way. The high price of silk due to worldwide demand, high transaction cost as well as constant disruptions in trade provided a strong incentive for several silk consuming regions and states across the world to acquire the knowledge of silk manufacturing (Ma, 1998). In several countries like Korea, Japan, India, Thailand, Italy, France, England etc., competition from Chinese goods stimulated the development of local manufacturing. The local manufacturers of those countries used Chinese silk or the yarn obtained by unraveling the old cloth. This monopoly ended around 300-200BC during a period of political turmoil in China and after the official opening of the Silk Road. The silkworm eggs were smuggled eastward to Korea, westward to Khotan (Central Asia) and southwards towards India[4].

The next wave of expansion of silk trade and silk production commenced around 300-400 AD. Within China, sericulture moved southwards to the central region (around Shanghai), which became the country's major producing area after the eleventh century. Silk production began around 282 AD in Japan, too (Needham. 1988). According to Minong (i.e., ancient books of Japanese history), four Chinese girls were brought to Japan and were employed in the Emperor's court to teach people the arts of weaving silk. In AD 552-556, sericulture reached the shores of Mediterranean. According to certain historians, Emperor Justinian, being curious to learn the mystery of silk, sent two Persian monks as Christian missionaries to the lands beyond the Caspian Sea. Eventually, they arrived at Khotan at a propitious time during silkworm season. The missionaries learned the process of silk production and smuggled out of Khotan the silkworm eggs and mulberry seeds hidden in their pilgrim staves (Hill, 2009).

However, further westward diffusion of sericulture technology was halted for some centuries more because of the reasons of poor economic conditions of the Byzantine Emperor than the relentless efforts to keep monopoly supply by the Chinese (Federico, 1997). Eventually, the Muslims brought sericulture to Spain in the 9th Century and to Sicily in the 11th Century. From there it began a slow march northwards along the Italian peninsula, spreading all over the Northern regions of the Western Europe in the 15th and 16th Century. At the end of the seventeenth century, the production of silk had spread to most of Asia and to the whole of Southern Europe.

Silk was that golden thread which bound the Eastern economy with the Western economy. Through production and trade several economies had enhanced their economic power. The major objective of this chapter is to trace the interconnecting forces which bound so many countries in the world together through silk trade. Those golden periods witnessed rise and fall of several major economies across the world around the production and trade cycle created by sericulture industry. The long history of worldwide production and trade in sericulture is thus very difficult to be confined within few counted words. This chapter will describe the historical trajectory of spreading the technological know-how of sericulture across the globe and how dissemination of that knowledge had created a global exchange relation between various countries through reshaping of their economies. This chapter will also illustrate the nature of overland and overseas trade routes and how the traders and middlemen through their specialized skill enriched some economies at the cost of others while exchanging this golden yarn. Prior to the focus in the succeeding chapter, on the Indian economy and its contribution to global silk trade reshaping the economies of major nations, it will be pertinent in this present chapter to explore few historical issues on sericulture

development in some specific countries of the world. The perspective analysis would hinge on domestic cultivation and external exchange propensities of the economies. Analysis of the present chapter will also precondition our mind for grasping the ideas which will be dealt in the succeeding chapter, i.e., the genesis of artisanal silk industry in India and specifically in West Bengal.

2.2 Spread of Silk & Manufacturing Technique from China

When silk was first discovered, it was reserved exclusively for the use of the emperor including his close relations and premier of his dignitaries in China. The monarch was believed to have worn a robe of white silk within the palace. Outside the mansion, the King, his principal wife and heir to the throne used to wear yellow silk, signifying the colour of the earth. With the passage of time, various classes of society began wearing garments of silk and it became one of the principal elements in the Chinese economy, the principal originator of silk in the world. Silk was used for musical instruments, fishing lines, and bowstrings, bonds of all kinds and even as rag-papers, a kind of luxury paper. In Chinese language, 230 out of 500 most common characters of the mandarin alphabets have silk as key. Farmers paid their taxes in grain and silk. Silk later was used for civil servants and for rewarding subjects for outstanding services. Values of silk were calculated in pounds of gold. Eventually, it became a currency and was used in trade with foreign countries. Trade routes were both overland and overseas. Dry route was open in the Han Dynasty (c.139BC) while the sea route was ventured much later as a conduit of trade during Sung Dynasty (960AD-1279AD).

2.2.1 Silk Trade through Silk Route

The annals of Han Dynasty (206BC–220AD) provided precise information about the famous trade route, i.e., Silk Road, through which the Chinese Silk had reached the Roman Empire. Some historians preferred the term "Silk Route" as they involved more than individual extensive route, few of which are rougher than caravan tracks. However, the term Silk Road (*Seidenstrasse*) or Silk Roads/Silk Route (*Seidenstrassen*) was coined not by any Han Emperor but by Ferdinand Von Richthofen in 1877[5] (Richthofen, 1877-1912) . For him '*Seidenstrasse*' was a singular route to the 'Land of Silk' as portrayed by the first century Greek geographer Marinus of Tyre, while '*Seidenstrassen*' were the multiple trade routes between imperial Rome and Han China along with the precious commodity of silk that traveled in substantial quantities from around 100 BC to about 150 BC (Waugh, 2007). Chief among the second fathers of the Silk Road label were Albert Herrman and far more significantly Richthofen's former student Stven Hedin (1855-1952) whose expeditions in Xinjiang and Tibet between 1894 to 1908 made the nomenclature 'silk road' much more popular in the common vocabulary of educated Europeans and Americans (Herrman, 1910).

The Silk Road was very long and complex, and its precise track varied widely with shifting political and military conditions from south of the Khyber Pass to north of the border of Siberia (See Silk Road in Fig-1). The Road left from Chang-An (now Xian), going either to the north or south of the Taklamakan desert before crossing the Pamir Mountains. The caravans that employed this method of silk exchange with other merchants were generally quite large, including 100 to 500 people as well as camels and yaks carrying about 140 kg (300lb) of merchandise. They took around one year to reach Antioch (city in Turkey) and the coasts of the Mediterranean from Xian. In the south of the Taklamakan desert, the second route went by Yemen, Burma and India before joining the northern route (Meyer, 2000).

The Silk Road was officially opened by the Sixth Han Emperor WuDi through his envoy Zhang Qian and his wild zeal had helped to explore and control China's Western Frontier. This was a significant location to determine the volume of trade expansion by China (Li. M.W., 1991). Joseph Needham (1954) emphasized that the first overland trade between China and Persia was opened up in 106BC through silk route and thereafter trans-Asian silk trade was regularized. Again, some commentators spoke that silk trade formally commenced through Emperor Wu Di in 139BC, although long before that silk was found in different places out of China (Good, 1995). The oldest known example of silk outside China came from the hair of Twenty First Dynasty (around 1000BC) female mummy from the workers' cemetery of Dar-el-Medina (Lubec et. al., 1993). Silk has also been found in the Scythian nomad tombs at Pazyryk in the Altai, dating from the 5th to 3rd Centuries BC and even in Celtic tombs of La Tene Culture (Archaeology in Edinburgh, Annual Report 2003,) in sites as far as Scotland and Germany.

Although Silk Route and silk production originated in China, the road was mainly dominated by Jewish, Armenian and Syrian middlemen. In the great cities of Samarkhand (presently, Uzbekistan), Isfahan (now in Iran), and Herat (in Afghanistan), silk trade was richly served by these dominators. It was due to their command, first the Greeks and then the Romans started believing that silk was manufactured in two different Far East kingdoms – a northern one, Seres (from wherever silk reached through dry route) and a southern one – Sinae (from which silk reached through water route). It was felt by many researchers that since the silk trade was dominated by two groups of merchants or middlemen and also through two different routes (sea route and silk road) it reached Rome and hence the misconception was naturally nurtured (Bernstein, 2008).

Silk originally reached Europe via land route, but the stability of the Early Roman Empire made the Indian Ocean the preferred conduit between East and West for almost all tradable commodities, including silk. Soon after the conquest of the Octavian's forces which defeated Anthony and Cleopatra at the battle of Actium in western Greece in 30BC, the ambit of Roman Empire had expanded. Trade and commerce started expanding rapidly between Romans and Asians and Roman appetite for silk clothing from Far East was met by the Persian middlemen through overland route. With each long and dangerous stages of journey, silk changed hands at dramatically higher prices. It was costly enough in its birthplace, China, and in Rome, it was yet a 100 times costlier-worth its weight in gold, so expensive that even a few ounces of it may consume a year of an average man's wage (Bernstein, 2008). The Roman senate tried to prohibit the wearing of silk for economic and moral reasons, as the import of Chinese silk resulted in substantial outflow of gold and degraded the economic situation of the country (See Seneca the Younger c. 3 BCE–65 CE, *Declamations Vol. I*).

Thus trade had swelled up between the Roman and the East during the early Roman Empire and declined abruptly after the death of Marcus Aurelius in the late second century. After that period, silk clothing was used by the most controversial transgender Roman Emperor Elagabalus (203-212 AD). He could afford in fact the rarest luxuries which arrived in Rome from India (Bernstein, 2000). On the other hand, the collapse of Han Dynasty in AD 220, the Parthian Empire in AD 227 and the end of Kushan age in AD 330 brought stern disruption and displacement of the first era of silk trade boom through silk route (Ma, 1998). The fate of silk trade on the eastern part of the Silk Road was closely tied with the abilities of the Chinese dynasties to control the western frontier. Byzantine Emperor[6] and Sassanid Empires of Persia survived the collapse of the classical age of long-distance cross cultural interactions

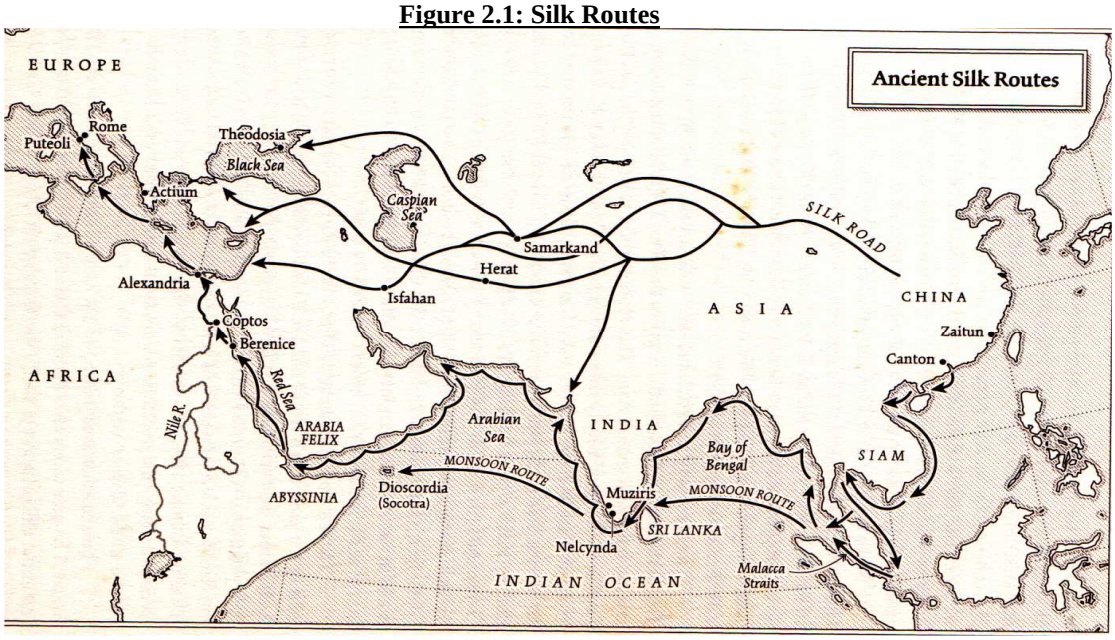
between China under Han Dynasty and Roman Empire. Eventually trade relation between Persia and Byzantium[7] flourished where silk was the major item of transaction (Bently, 1966). One of the most important developments during 400-600 AD was that growth of a large silk trade stimulated the establishment of silk weaving industries in both Byzantium and Persia (Needham et al. 1988, Lopez 1945). Their importation of large volume of raw silk from China and India propelled the global silk trade and a large section of the East-Asian economies.

The second phase boom of the overland silk trade was during the period of Tang Dynasty (AD 618-960). Successful global trading of silk in first two centuries by these Tang Emperors actually helped them to increase the number of oasis towns in the western frontiers. In 7th and 8th centuries when Tang Kings were ruling in China, the Islamic power attempted to expand their territory on the eastward direction. The victory of Muslim over China in AD 751 on the Talash River[8] was a turning point for the history of silk trade. It enabled the continuing intrusion of Islamic Power which led to gradual weakening of Tang Kings and partial closing of overland trade through Silk Road for almost four hundred years, until the era of Mongol Empire (Needham 1954; Boulnois 1966). This ultimately resulted in the displacement of Chinese economic, agricultural, industrial and population hub from Yellow River to Yangtze River and coastal region. By the time of the Sung Dynasty (AD 960-1279), the most productive silk centers found their home in the lower Yangtze River delta, far away from Xian (the starting point of Old Silk Route). This locational shift of trading centers led to the increasing use of sea route for silk exchange (Fan and Jin 1933).

2.2.2 Trade through Sea Route

The sea route was cheaper, safer and faster than overland transport and in pre-modern world the traders could avoid the unstable zones of overland exchange. Chinese traders from southern ports loaded their ships with silk for the long coastwise journey down to Indochina and around Malay Peninsula and Bay of Bengal to Sri Lanka. There they would be met by Indian merchants who would then transport their fabric to Tamil ports, i.e., Muziris, Nelcynda and Comara (Bernstein, 2008).

Figure 2.1: Silk Routes



Source : Bernstein (2008)

On these southwest coast ports of the Indian subcontinent, large number of Greek and Arab intermediaries handled the onward part of the trade to the island Dioscordia. From this island, the cargo used to float on Greek vessels through the entrance of Red Sea at the Bab el Mandeb (i.e., Gate of Sorrows) to the main point of Berenice in Egypt; then across the desert by camel to the Nile and next by ship downstream to Alexendria, where Greek Roman and Italian Roman ships moved silk across the Mediterranean to Rome (ibid, 2008).

While it was observed that the Chinese had never ventured westward of Sri Lanka, Indians have seldom expanded the water route beyond Red Sea and the Italians had never crossed south of Alexendria. However, Greek merchants ranged freely from India to Italy to carry the greatest share of traffic of Silk trade. On the whole the sea route trade of silk was dominated by Greek, Ethiopian and Indian traders (ibid, 2008).

During the 8th and 9th Century, the Islamic shipmasters penetrated the Indian Ocean, the South East Asia, China and even reached Korea and Japan (Needham, 1954). Towards the end of 12th Century, Chinese silk merchants governed the Pacific waters (Needham, 1954). An expansionary trade policy was pursued by the merchants of Mongol-Yuan dynasty and overseas trading was extended up to Indian Ocean. During 1400-1431, maritime supremacy reached its zenith when the magnificent fleet led by Zheng Ho[9] of Ming Dynasty sailed to Borneo, Philippines, Ceylon, Malabar and even East Africa. However, the Ming Government was not in favour of opening private trading in the sea route. This restrictive attitude ultimately opened up the arrival of the first European power, Portugal, to dominate the sea route. Vasco-da-Gama by 1488 found his way to India by passing the mighty Ottoman barriers and rounding the Cape of Good Hope.

However, before illustrating the history of silk in India, it is worth exploring the history of silk about the major countries whose position in global sericulture was very noteworthy. The trends of silk production and export and import propensities of those countries can depict the situation of this artisanal industry from historical and global perspective.

2.3 Genesis of Sericulture in Silk-trade-driven Continents of the World

The genesis of sericulture in a few significant countries in the world will be discussed in this section. Some of them have emerged as significant producers or traders (both exporters and importers) in the later phases, while some of them have become obscured from the pages of history. According to the production supremacy and trade dominance in the world market, certain countries as well as continents other than China and India whose genesis of sericulture is worth illustrating is attempted in this section. They are the countries of Asian continent like, Japan, Korea, Thailand, Vietnam, and the European countries which includes Italy, France and England. A brief history of the spread of sericulture in each of these aforesaid countries is illustrated in Table1.

Table 2.1: Chronological Genesis of Sericulture & Development of Silk Production

Time	Beginning of Sericulture	Development of Silk Production
c. 3000 BC	Sericulture was discovered and utilized in China (Matsui, 1930; Fan &Wen, 1933)	
c.1300-1400 BC	Silk production (tussah silk, not *Bombyx-Mori* started in India (Literary Source, Mookerjee 1719, Federico, 1997)	
c. 400 BC		Ancient Indian texts mentioned about Chinese Silk (Devon, 1998)
c. mid 100 BC	Sericulture brought to Khotan (West China) (Matsui 1930, Fang 1983)	
c. 140 BC	Sericulture spread to India through Khotan (Dutta & Nanavaty, 2007)	
c. 100 BC	Sericulture brought to Korea by Chinese immigrants (Needham, 1988)	
c. AD 100		Silk weaving in Syria & Palestine (Needham 1988)
AD 282	Sericulture rooted in Japan (Needham, 1988)	
c. AD 300		Sericulture weaving in Persia and Byzantium (Needham 1988)
AD 500-640	Sericulture introduced to Persia (Xu 1990)	
552 AD	Sericulture introduced to Byzantium (Needham 1988)	
c. 8th Century		Silk weaving brought to Spain by Arab conquest (Edler 1930)
c. 9th Century	Sericulture brought to Sicily (Italy) (Edler 1930)	
c. 10th Century	Large scale production and export of raw silk in Southern Spain (Edler, 1930)	
c. 1238– 1350AD	Beginning of Sericulture in Thailand (Hoare, 2004)	Silk weaving took root in North Italy, specially in Lucca (Edler 1930)
Late 12th and early 13th Century		Silk weaving took root in North Italy, specialy in Lucca (Edler 1930)
14th Century	Sericulture spread to North Italy	Silk weaving in France and Cologne,

	(Edler 1930)	Zurich, Giret (Edler 1930)
15th Century		Silk weaving started in England (Edler 1930)
16th Century	Large scale sericulture took root in France (Leggette 1949)	Silk industry also flourished
1530 -80	Sericulture flourished in Mexico (Borah 1943)	
1623	Sericulture experimented in North America	

Source: Ma Devin (1998)

2.3.1 History of Silk in Japan

As mentioned earlier in the chapter, the widespread Minong story of genesis of silk and sericulture, according to which sericulture was brought to Japan by 282 AD (Needham, 1988). Another legend says that around 300BC it was due to war the sericulture industry got access in Japan. Semiramis, a general of the Japanese Empress Singu Kongo invaded Korea and later conquered it and brought home many captives including sericulturists. Japan began to practice sericulture and Emperor Ninken ordered mulberry trees to be planted throughout the countries. Techniques of sericulture were subsequently introduced and improvised on a large scale by frequent diplomatic exchanges between 800-900AD. Thus under royal patronage, the sericulture industry continued to thrive.

Sericulture was one of the most dynamic areas of Japanese economy in the Tokugawa period (1603-1868). Tokugawa shoguns were aggressive leaders who divided Japan into large number of economic units called ‘domains’ or ‘hans”. The domains were obligated to contribute to castle building and public works, which resulted in huge drain of wealth from domains to central areas of Japan. Even in case of poor domains around 70-80 per cent might have flown to Shogunal capital (Fujino and Ono, 1979). To counter these outflows of wealth, many domain governments started introducing policies of developing industry and promoting enterprise, fostering the production of local commodities for sale in the local market. One of these most important commodities was silk. Besides, sericulture, by giving small manufacturers an additional source of income, also provided a hedge against famine in the years when the rice harvest was poor (Morris-Suzuki, 1992).

In 1701, the Japanese government of Tsugaru domain brought in silk specialist from Kyoto to advise the rural sericulture farmers and artisans and to provide loans in terms of cash and kind for the establishment of mulberry cultivation (Saburo,1975). During 1780s and 1790s Yonezewa domain introduced a series of economic reforms including measures to encourage the silk industry. These involved the establishment of a domain sericultural agency, the provision of four years of loans to farmers and provision of a dozen of nurseries for germinating mulberry seedlings (Izuta Chuetsu, 1979). Like Tsugaru, Yonezawa domain brought in sericulture and silk reeling experts from other parts of the world and used the knowledge as a basis for a handbook published in 1806 as the Yosan Tebiki (Manual of Sericulture) (Saburo, 1975).

Domain policies resulted into expansion of artisanal silk farming in Japan. Extension of silk farming was observed during 17th to 19th Century. An additional political contribution behind this spread was Tokugawa Shoguns' tight control over foreign trade and particularly the restriction imposed on imported Chinese silk since 1685. Until that time the famous silk weaving industry of Kyoto depended on China for supply of its raw materials. In the mid 17th Century less than one third of 290,000 kin (Japanese Unit of Measurement, 1000 kin = 6.61 ton) raw silk used in Kyto's silk weaving districts Nishijin, was domestically produced (Kiyokichi et al., 1985-86). The remainder was imported from China including its technical know-how. By the end of the 17th Century, silk production began to diffuse widely through out the country and the domestic producers' increasing interest was experimented with new sericulture methods. By 1715, the Nishijin weavers were using 200,000 kin of Japanese raw silk a year and by 1820 the figure touched a towering level of around 2,250,000 kin (ibid, p 105).

In addition to this, development also included spatial extension and structural promotion of production. In the early Tokugawa period, the main centers of sericulture was rural areas close to the city of Kyoto, while new centers of silk weaving, like the town of Kiryu in eastern Japan, were developing rapidly in the second half of the Tokagawa period (Yoshima Jinsaku, 1982-83).

Division of labour was introduced along with the specialized skill of the artisans. The process of technical expertise which shaped the economy's abundance of labour and storage of resources boosted Japan to achieve its targeted growth. Small peasant farmers grew their own silkworms and reeled their own thread. Only the weaving industry exhibited specialization skill. However, during 18th century the central constituency of silk production shifted to the modern regions Nagano, Gumma and Fukushima (Kudo et al., 1985-86). Consequently, there was a gradual separation between various stages of production of artisanal silk. Certain farmers began to produce silk worm eggs only and started acquiring considerable wealth. At the opposite end, some rural merchants thrived on organizing putting out of cocoons for reeling by peasant families. However, this became clearly evident after the second half of the 18th century and remained largely confined in the relatively advanced areas close to the expanding silk towns of Kiryu and Ashakiga. The specialization of labour force was complex even within the weaving towns. In Kiryu, the large weaving houses began to employ increasing number of wage labour and to subcontract labour to specialist dyers, pattern weavers and loom carpenters (Ichikawa, 1959).

Despite innovations of gear and belt driven labour saving technology in the early 19th century, the method of artisanal silk production in Japan was completely labour intensive (Negishi Hideyuki, 1989). Abundance of labour and shortage of capital resources configured Japan to exploit its productivity of raw materials even at the cost of increasing working hours.

Japan was a late joiner in global silk trade. Restrictions imposed by Tokugawa shoguns at 1685 helped the import substituting domestic artisanal silk industry to strengthen their foothold on one hand and borrowing the Chinese, particularly Yangzi technology, the industry gathered its momentum. In 1860s and 1870s, Japan became the most important supplier of quality silkworm eggs for Europe. Between 1850 and 1930, the raw silk export from Japan amounted to 20%-40% of its total commodity export basket. In 1873, China exported three times more than Japan, but by 1905, Japanese raw silk exports exceeded the Chinese and in 1930 Japanese raw silk exports tripled than that of China and achieved a

dominance of 80% share in the world market. As cocoon sector used to contribute 60% to 80% value addition of raw silk, a major part of the gains from trade was flown back to the silk-artisan classes of Japanese economy. As a matter of fact success of Japanese silk exports largely hinged on accurate knowledge and proper care to inhibit the spread of silkworm diseases. It had become so renowned that by 1840, the technical know-how of Japanese sericulture came to France through a sericulture manual book magnificently illustrated by a local farmer Uekaki Morikuni[11]. Details of Uekaki's biography are given on pp. 80-84 of the supplementary text. This book was published in French language several times as devastating silkworm plague, known as pebrine, tightened its grip on European silk regions. Following the crisis of Europe, i.e., in the later part of the 19th Century, the modernization of sericulture in Japan made it the World's foremost silk producer. During the later part of the 19th century and beginning of the 20th Century, Japan made serious efforts to develop industries. The uninterrupted flow of value chain had brought this success as the direct purchases between reelers and farmers were established bypassing the intermediary markets and middlemen. After World War –I, the direct exchange between reelers and farmers or farmers' co-operatives markedly increased. By 1923, cocoons sold directly to the reelers were 46.6% of total sales, higher than 23.9% sold through the cocoon markets and merchants previously. Sub-contract system was evolved as another institutional innovation from this direct exchange system. This system presumably commenced from 1905 in Japan and involved a long term exchange between silk-farmers and reelers. From 1926 to 1933, the growth of cocoon selling share augmented from 12.5% to 40.1% in Japan (Morris-Suzuki, 1992) .

1930's Great Depression and US stock market crash affected the price of raw silk and Japan faced "silk crisis" due to extensive administrative support of stockholding (Ryu 2009). However, during the Second World War, silk supplies from Japan to external world were cut off. Even after the war, silk was not able to regain many of the lost markets.

2.3.2 History of Silk in Korea

Sericulture reached Korea from China during Han Dynasty when few Chinese immigrants arrived there around 100BC (Needham, 1988). Pictorial evidences were found from historical texts and wall paintings of 1st Century illustrating that fine silks were worn by the aristocracy when Korea stood at the end of Silk Road between Roman and Chinese Empire (Pratt and Rutt, 1999). The earliest example of Korean Silk was fragments found in the 6th century Heavenly Horse Tomb in Kyongju.

Another opinion regarding this earliest indication of silk in Korean history was found in 37BC, when the first King (Hyokkose) and Queen (Aryong) of Silla Dynasty started promoting sericulture in the villages. They roamed across the villages and taught the farmers how to produce silk by feeding mulberry leaves to silkworms (Carriere, 2006). They also inspired their subjects to spin thread from the cocoons and weave clothes. The King had his queen accompanying him in this venture because it was generally the women who cared for silkworms and did the spinning and weaving. In Korean societies, it was the task of a royal woman to administer the production of silk as the market value of the final product was enormous. Besides understanding its use value as soft and light wear as well as cold resistant and offering protection to wounds in the time of battle, Korea could comprehend its scarcity value and used silk also as a medium of exchange (ibid, 2006).

In the 5th Century, Korea was divided into three kingdoms -(i) Koguryo (37BC-668AD); (ii) Paekche (18BC-660AD), (iii) Silla (57BC- 668AD)- that were constantly fighting with each

other. Silla united the Kingdom with the help of China and the unified Silla Kingdom ruled Korea during 668AD-935AD. Silla blended Kogryo's military skill and Paekche's artisanal skill. They maintained diplomatic relation with China and took the benefit of Silk Road. Towards the end of the three kingdoms period (57BC –AD 668), a new style of silk robe was introduced in Korea. Silk was used as an attire of luxury and was confined within Royals and high-class officials. In course of time the popularity of silk spread amongst general rank and file as sericulture became a mainstay of livelihood for the rural inhabitants of erstwhile Korea. However, up to 200AD Korea had almost no involvement with Silk Road. The connection with Silk Road from Korean kingdom commenced from 4th century. During 400-1000 AD Korea actively traded through Silk Road. In the 8th and 9th Century, Chang Po and his military force based on the Cholla province in the south western area of Korean peninsula were able to control many of the Chinese and Japanese sea trade routes. This allowed silk to spread to Silla and from there to Japan. With the assassination of Chang Po, Silla's control of the naval trade ended (Lee, 1993).

Korean silk industry was developed under the colonial rule of Japan since 1910. This was perhaps the reason why many historians had treated this industry as an extension of Japanese artisanal silk industry. As a matter of fact, development of sericulture and silk reeling industry in Korea was initiated by market integration and encouragement of colonial government and establishment of silk reeling companies by Japanese companies. In the first decade of the colonial rule, the colonial government tried to enhance sericulture through cocoon export promotion to Japan. In 1920s, however, several Japanese companies started establishing steam filatures for silk reeling in Korea. As a result, export of raw silk increased at the cost of that of reeling cocoon. Korean raw silk was primarily exported to Japan and then after quality test-checking, it was further exported to US market. In the Korean silk industry, both hand reeling and steam reeling were expanded till 1934. The proportions of hand reeling was more than 30 percent compared to steam reeling. In Korea, steam reeling was for exported silk and hand reeling was meant mainly for domestic consumption. Domestic consumption means non-overseas as well as non-factory consumption. Large amounts of cocoons were transacted outside the purview of market system as every household used to have one basin on an average. Almost all women in domestic frontier used to spend their labour for domestic reeling and weaving. The activities were performed under the same roof. This was the reason why no conflict was observed between cocoon producers, reelers and weavers as they were from the same households. Naturally, they expanded their mulberry farm and more profits were realized. They only judiciously allocated their cocoons for selling between Japanese farmers and weaving of their own fabric (King, 1975).

In late 1920s several Japanese companies started establishing silk filatures in Korea as the domestic reeling production of Korea was backward. Colonial government in Korea made special rule to attract Japanese capital and thus there was a transfer of reeling industries from Japan to Korea during this period. The special rule to attract Japanese capital was known as 'Special Sales'. Under this system only big filatures were favoured and thus the system suppressed Korean cocoon market and the emergence of small reeling and weaving factories in Korea. However, in spite of strong restrictions two cities in Korea namely, Kyongon and Tegan were developed outside this 'Special Sales' system and almost half of reeling factories of Korea were located within them. Thus the reeling was polarized into domestic hand reeling on one hand and big steam filatures by this system, on the other (King, 1975; Ryu, 2009).

In the 1930s, prices of cocoon fell sharply followed by an abrupt fall of silk price as a consequence of 'silk crisis'[12]. However, Korean sericulturists did not quit the market. They only decided to stop selling 'reeling-cocoon' in the market and concentrated on silk fabrics instead. The justification was that price condition was favourable for silk fabrics in early 1930s. Thus sales of silk fabrics was increased which was consequentially imported by Japan which almost quit producing silk as a fallout of silk crisis (Wilson, 2003).

Later in 1945, Korea was split into two segments and two-thirds of sericulture area remained within South Korea. During internal political turmoil in South Korea, silk industry was struck and filatures were destroyed and mulberry plantations were uprooted. Rehabilitation was done in South Korea during the 1960s and ultimately it emerged as the foremost exporter of raw silk after Japan and China. During 1960s, silk production in Korea grew at the rate of 20 percent. Korea modernized every phase of silk production and produced over 5000 MT of raw silk annually until the mid 70s.

2.3.3 History of Silk in Thailand

The archaeologists found that the fibres of silk in Thailand was over 3000 years old in the ruins of Baan Chaiang, which many of the scholars considered as earliest civilization of South Korea. Excavations in the villages of Baan Chaing also revealed a cluster of unwoven and undyed silk thread. Similar silk thread remnants were found in the pre-historic area of Ban-nadi in Nong Han, Udon Thani. Both discoveries strongly suggest that sericulture existed amongst Thailand's pre-historic civilizations (Kusnaman, 2004).

The production of Thai Silk begins with Bombyx mori, which produces silk thread of varying colours, ranging from light gold to very light green. Thai silk fabrics have a unique texture because of uneven yarn size and knots in between. The fabrics manufactured in Thailand are yarn dyed with peculiar printing designs, which have global attractions. As sea routes were discovered silk trade started booming with China. Archaeological evidences supported that silk traders had reached the early Mon settlers of Dvaravati Kingdom in Siam (presently Thailand). In 1250 AD , the King Ramkhamhaeng of Sukhothai (first kingdom of Thailand) established diplomatic relations with China and silk fabrics were exchanged as token of gifts. Thai settlers in Cambodia were growing mulberry trees, raising silkworms and producing silk clothes which were mentioned by the Chinese envoy Cho Takuan in his note in 1296. Thus evidential proofs supports that Thailand had a good trade relation with neighbouring kingdoms, China and Cambodia (http://iqproducts.8m.com/history/).

The 16th and 17th centuries saw Europeans voyaged Siam and silk was bartered along side other Thai goods including ivory, leather, acacia, wood, ceramics and paper. Many silk were woven in India based on Thai design and imported into Siam. Record from the court of Ayutthaya, capital of Siam, explained the techniques of raising silkworms and described the abundance of luxurious silk fabrics. In 1608 King Ekatotsarot of Ayutthaya sent a Thai emissary to Netherlands bearing valuable gifts for Stadholder including silk fabric. Historical records mention that Persian ikat (Mudmee Thai Silk) worn by a Thai ambassador to the French court inspired so much that ikat style of weaving and design h d started at great silk centres of Lyon. Handwoven Mudmee Thai Silk (also known as 'ikat') comes from the north east of Thailand, which is called "Ishan" and comprised of 17 provinces and situated on khorat plateau. The Mekong River borders the whole regions into eastern and northern frontiers with Laos. Its Western and Southern frontiers are mountain ranges that form rim of

the plateau. The intricate traditional geometric and zoomphorbic motifs of Mudmee Thai Silk have been handed down for countries. The design and pattern in Mudmee are created primarily by using various colours in the weft (left to right thread) of the fabrics (http://thaisilk-b.blogspot.in/2007_07_22_archive.html).

The people who migrated into the Central and Mekong river basin area of Northeast Thailand from Pakse and Savankhet Laos brought their weaving skills with them. In 1857, King Mongkert (Rama IV) sent magnificent of silk-brocades to Queen Victoria and showed Europeans that the quality of Thai silk matched with that of British Empire. During his reign British counsel Sir John Bowing noted that all costly silk garments worn by the persons of high rank were woven in their own houses. In 19th century, Thailand's King Rama V introduced advanced technology, which created the foundation of the country's large silk industry. Weaving of fabrics is generally in the cottage sector and large numbers of households earn their livelihood from silk weavings. The northeast region remains the main center of silk production. However, weaving of silk fabrics is spread all over the country. Most fabrics produced are plain and woven on handlooms. There is also some quality fabrics produced on power looms for export to Japanese markets. In addition to local silk production, Thailand also imports silk fabrics and garments for local consumptions. The items sold locally include shirts, dressing gowns, skirts, sarongs, scarves, neckties, cushion covers, pillow covers, bedspreads, table linens, tablemats and other furnishing. Flood of fabrics including fabulous silk from China, Persia and Japan made it difficult for the local skill to compete (http://mitzissilks.com/index.php?main_page=page&id=23).

In 1901, King Chublongkom put his efforts to upgrade the local silk by inviting a team of Japanese experts to aid production. In 1903, the department of Craftsmen was established in Thailand. These steps marked the beginning of rapid progress of sericulture in Thailand. Mulberry trees were planted in the northeast of Thailand, local silkworms were crossbred with Japanese high yielding variety, modern spinning and hand reeling machines were introduced and traditional looms were replaced by more advanced ones. Experts started teaching sericulture through out the kingdom and thus Thailand excelled not only in domestic production but also in foreign export market (Becker, 2013).

2.3.4 History of Silk in Vietnam

Vietnamese sericulture began more than 3000 years ago probably under Chinese influence. Following the stories of Van Phuc (the largest sericulture village in Vietnam) artisans, the first Vietnamese silk maker was Princess Hoang Phu Thieu Hoa, also known as Mo Nham. She was the daughter of King Hung Vuong, the King of first Dynasty of Vietnam around 3000 years ago. According to the book of Han[13], Lac Viet's (northern Vietam) silk production dated back to 2000 BC.

Vietnam's best silk came from the area of Ha Tay, south-west of Hanoi in the red river Delta. Silk from this area was often called 'Ha Dong Silk'. The art of silk in Ha Tay had begun around 2000 years ago. Between 16th -18th centuries, Ha Tay's silk industry flourised. The most famous sericulture villages were Tring Tiet and Van Phuc. From old looms, Van Phuc weavers used to create beautiful styles of silk like, brick-wall, diagonal etc. The most famous creative work was lua van[14]. The artisans drew the idea of this bulged clothing from flowers and the clouds and the jet over bamboo thickets in summer sky (Vietnam Plus, 2009).

In 1040, King Ly Thai decided to make court costumes with local silks instead of the imported materials used before. During this dynasty silk weavers started producing silk with vibrant colours and patterns. Artisanal Silk has been continued practicing ever since by most villages in Vietnam largely for their own use as well as for the domestic market. It was only after French arrival in Vietnam in 1859, export-potential capacity of silk was exploited. Then for a brief period of time, Vietnamese silk production was abandoned (ibid, 2009).

It was only after traumatic years of Second World War and intense struggle for power between South and North Vietnam, the country has been reviving sericulture. In the post Second World War periods, 85% of some 10,000 hectares of mulberry land of North and South Vietnam was diverted to other cash crops. After reunification of this small nation in 1975, the tradition of silkworm rearing got the state patronage. And Vietnam Union of Sericulture Enterprises (VISERI) was set up for developing sericulture and modernizing silk reeling, weaving and training farmers for better silk productivity (Exim, 2002). Vietnam has been often cited as an example in the World Bank survey, as speediest revival of artisanal silk industry. Bao Loc and Lam Dong highlands are the sericulture rich areas in the country. With sub tropical climate, it is estimated that around 80 percent of its raw silk comes form Lam Dong province (Thanh, 2006).

2.3.5 Silk History of Brazil

The first initiative to commercial processing of sericulture was taken by Emperor D. Pedro II in state Rio de Janeiro of Brazil in the middle half of nineteenth century (Fonseca et al., 1986). After a period of decadence (i.e., in1923), sericulture was resumed in the eastern part of Sao Paulo state of Brazil by Italian settlers. Later, eastern Sao Paulo showed a decline in sericulture and western Sao Paoulo flourished as Japanese immigrants started organizing the artisanal silk in Brazil on commercial basis. According to the commentators, movement of sericulture from one place to another occurred as low income situation of the poor played a dominant role. Farmers wanted to choose sericulture as a secured livelihood opportunity against alternative crops other than the soil and climatic conditions at the backdrop of declining production and profitability of alternative crops (Eduardo de Almedia et al., 2000). After the Second World War, sericulture in Brazil suffered a setback and retrieved to normalcy only in 1940s. In 1940, Bratac, a regional place in Parana state, started producing raw silk through its filature. It achieved the best raw silk reputation in the world market.

In early 1970s, several Japanese trading houses looking for alternative supply sources established some silk production units in Sao Paulo and Parana in Brazil. In 1992, six filatures in Brazil could produce raw silk from 19.134 tons of reeling cocoons. Brazil is presently second largest exporter of raw silk in world market. Now more than 80% of sericulture and silk production in Brazil is controlled by Japanese immigrants. Sericulture in Brazil is confined chiefly in two states, Sao Paulo and Parana , though some silk farms are found in Santa Catalina and Mato Grosso du Sul. Brazil's silk season beginning in September/ October lasts until May and farmers take four crops a year. The average cocoon yield is equivalent to that of Japan and Korea (http://www.bacsa-silk.org/user_pic/file/Berdu_Silk%20in%20Latin%20Amercia%202013.pdf).

2.3.6 History of Silk in Europe

As early as in 500 BC Chinese Silk was first discovered in Europe when Rome was under the Regal era; but well recorded trading was revealed in Han Dynasty (202 BC – AD 220) (Ma,

1998). According to Needham (1988), the first recorded silk trade through caravan from China to Persia was around 106BC. The Romans started importing silk from China through Parthian Empire (or Persia) perhaps in the end of the first century AD. The Old Testament indicates that the prophet Ezekiel (623-571BC) knew about silk.

Historical evidences supported that the Roman statesman Julias Caeser (100-44BC) used silk curtains. Ambit of Roman empire expanded after 30BC as Octavian's forces defeated Anthony and Cleopatra at the battle of Actium in western Greece. Eventually Rome was flooded with silk. Silk trade between Rome and China expanded till the reign of Roman Emperor Marcus Aurelius (161-180AD). Roman Emperor Elagabalus[10] was the first Roman ruler who was perhaps fond of Indian Silk (Bernstein, 2008).

When Justinian First became monarch of Byzantium in AD 527, the traditional Roman woolen toga had gone out of fashion and silk tunics and other garments were increasingly used by both men and women. The Byzantine historian Procopius (500-565AD) told the story in his book 'History of Wars' of how the Roman Empire acquired its own sources of silk. According to him, some traveling monks from Sogdania convinced Justinian Augustus that the Romans should no longer buy silk from their enemy Persia. They said that they were formerly in Seri-India (North of India, i.e., China) and learnt the art of silk production. They actually taught the Justinian Empire about the technology of making silk (Feltham, 2009).

Byzantium had to negotiate in silk trade with Persia at the cost of several issues. The problem was not regarding production. Syria was a principal silk fabric producing center of that period and much of their silk fabrics were exported to Japan (Hayashi, 1975). In countries such as France and Italy, silk yarns and smothered cocoons were widely traded commodities and much of it came from several Asian countries including China (ibid, 2009).

In 747 AD, the first King of Sicily invaded Greece and captured a number of silk weavers who were forced to settle in Palermo and teach the art of sericulture. Within two decades Sicilians mastered the art and manufactured quality silk fabrics. This is how sericulture started in Italy. The silk industry spread through Italy during 12th and 13th centuries. For about 300 years Italy practically controlled the European silk trade. Silkworms were raised on lands owned by nobles. Lucca, Venice, Pisa Florence and Milan were the famous silk centers. Lucca was one of the most vital centers of Western European Silk Industry (Lopez, 1952) and Genoa was the principal port feeding Lucca market. In the earliest records of Lucca of 1246, there was no mention of Chinese silk or Indian silk. The earliest entry of Chinese Silk was in January 1257 when Mongolians had not completed the conquest of China. Then onwards trade relation between Italy and China expanded.

From Italy the secret migrated to France. France concentrated upon weaving and set up silk mills in both Tours and Lyons. In 1480 silk weaving began under Louis-XI at Tours and in 1520 Francis-I brought silkworm eggs from Milan and reared in Rhone valley. Francis-I encouraged and supported sericulture and he was the first king to wear pure silk stockings. After Francis-I, both Henry-II and Henry-III patronized the silk-weaving industry but it was Henry-IV who introduced silk worm rearing in to France. During his reign, agriculture was in a low state and he decided that France should not only weave silk fabrics but also undertake actual silk production. In his time 20,000 mulberry saplings were imported from Italy and planted in Tuileries. Throughout the 18th Century, France enjoyed a prosperous silk weaving trade and sericulture growth. Lyon was the hub of French Silk industry (Datta and Nanavaty, 2007). Napoleon was also fond of silk. He ordered that walls at Fontainebleau, St Cloud, St.

Germain, and Versailles be covered with rich layers of silk. Every victory of Napoleon was reproduced in Brazilian colors in silk tapestry by Lyon's silk plants. In 1805 came the celebrated discovery of Jacquard, who perfected the device of figured cloth, which carries his name. In 1847, 6000 establishments producing jacquard fabrics were working in Lyon (Farrell, 2014).
In the middle of the 18th Century, the production of new cocoons reached 7000 MT and then it rose to 17000 MT in 1845 and at last touched the record figure of 26,000 MT in 1853. From the beginning of the 19th Century when sericulture was at its peak in France, a mysterious disease broke out, which was later identified as pebrine (Datta and Nanavaty, 2007). The disease wiped off not only sericulture from France but also from the rest of Europe and most of the Middle East. The young scientist Louis Pasteur set to find out the cause of such great affliction. With four years of intense research, he detected the disease in silk worms-'la pebrine'. The production of cocoons, which had fallen to 5000 MT in 1865, swiftly rose to 14000MT in 1870. The method advocated by Pasteur for elimination of Pebrine popularly known as 'Cellular method' has since then served as the foundation of silkworm rearing practices the world over. But the sericulture in France never revived completely mainly due to social and economic changes destroying the rural handicrafts.

Although silk weaving & mulberry cultivation might have existed in Britain before James-I, it is indisputable that James-I (1603-1625AD) introduced silkworm rearing in England. The King ordered 'thousand of mulberry trees from France & offered seeds free to anyone who could sow them'. Silkworm eggs were obtained from Italy & experimental rearing were carried out. The King himself had mulberry plantations within his Palace Garden. He exhorted settlers at Virginia to prefer silk to tobacco cultivation (Frank, 1921).

The next monarch to take a keen interest in sericulture was George-I (1714-1728). For reviving sericulture during this period, a patent was granted in 1718 to a certain John Appleton who imported 2000 mulberries & planted in Chelsea Park But Appleton's scheme ended in failure. Again in 1825, an attempt was made to introduce sericulture during the region of King George IV (1820-1830AD) with formation of the British, Irish & colonial silk company. The company planted 80 acres in country cork and in another 19 acres of fine rich soil near Slough but never did sericulture enter into commercial phase. Earlier in 1718, mechanized process of silk throwing was introduced in England by John Lombe who mastered the closely guarded secret while working in disguise as a journeyman in Italy. First throwing mill was set up in Derby, followed by more mills in Macclesfield, Congleton, Leeds & other places (ibid, 1921).

In the early 17th century English continued to look eastward for raw-silk supply in order to diversify the silk market with cheaper and lower grade raw silk (Ma, 1998). With the establishment of British East India Company (EEIC) , Britain and Holland started finding ways to bring raw silk directly through Cape Route. They succeeded in diverting the raw-silk exports of Iran from caravan route to the sea route (ibid, 1998). The search for cheaper silk route ultimately brought the British further eastward along the silk route. From the middle of the 17th century, EEIC started using large scale imports of raw silk from Bengal.

2.4 The Silk Trade Today

If the comparative production status of silk is analysed in comparison with that of other textile fibres for the years of 1975-2000, its position will be found merely significant (Table 2.2). The share of silk in world production of all textile fibres in 1999 remained unchanged

from its 1995 level of about 0.2% (ITC-ITF, 1999; Exim Bank, 2002). Market analysts assume that silk would never be available in large quantities and international supplies would certainly remain limited in the future. Before analysing trading situation of silk, it is essential to derive its demand opportunities and supply constraints. This view regarding world wide supply constraint continues to be supported by the information from China, where the growing domestic demand for silk products will eventually affect supplies available for export. In addition, a significant relocation of mulberry growing and silkworm breeding is under way in the country as industrialization continues apace.

Production figures for the world's leading producers of raw silk for various years between 1938 and 1999 are given in Table 2.3. While world production rose by more than 100% between 1978 and 1993, it dropped by 30% from 100,000 tons in 1993 to 70,000 tons in 2000. The positions of China and India as first and second largest producers remain unchanged during this phase. Production in Japan continued to fall and in 1999 was about 2.5% of its 1938 level. It is contextually significant and worth mentioning that more than 70% of China's output is bivoltine silk, which is necessary for producing much of the silk required for international trade. In India, more than 95% of the silk produced is multivoltine (tropical). China had an output of about 50,680 tons of raw silk in 2000, a drop of more than 10% from 55,990 tons in 1999.

Table 2.2 World Production of Textile Fibres during 1975-2000 (in thousand tones)

Year	Cotton	Synthetics	Cellulosic fibres	Wool	Silk	Total
1975	11,809	7,346	2,959	1,502	49	23,665
1980	13,981	10,476	3,242	1,608	55	29,372
1985	17,540	12,515	2,999	1,673	59	34,786
1991	20,830	16,440	2,860	1,940	75	42,145
1995	19,200	20,200	3,000	1,600	100	44,100
1999	19,200	28,300	2,700	1,400	76	51,400

Source: UNSD/ITC Comtrade Database System, 2000

Table 2.3 Production of Raw Silk in the World during 1938-2000 (in tons)

Year	1938	1978	1986	1992	1995	1997	1999	2000
China	4,855	19,000	35,700	54,480	77,900	55,117	55,990	50,683
India	690	3,475	8,280	12,600	12,884	14,048	13,944	15,214
Brazil	35	1,250	1,680	2,280	2,468	2,120	1,554	1,389
Uzbekistan	1,900	3,240	4,020	2,160	1,320	2,000	923	1,100
Thailand	n.a.	n.a.	n.a.	1,589	1,313	1,039	1,000	955
Japan	43,150	15,960	8,220	5,100	3,240	1,920	649	557
Republic of Korea	n.a.	n.a.	1,680	910	346	146	28	15
Viet Nam	n.a	n.a.	n.a.	n.a.	2,100	834	780	n.a.
Democratic People's Republic of Korea	n.a.	n.a.	n.a.	1,200	600	200	150	n.a.
Iran, Islamic	n.a.	n.a.	n.a.	423	750	500	n.a.	n.a.

Republic of								
Other	4,045	2,200	2,880	1,677	2,217	1,666	1,272	1,250
World	**54,675**	**45,125**	**62,460**	**82,419**	**105,138**	**79,590**	**76,290**	**71,163**

Source : ISA (http://www.tradeforum.org/International-Silk-Association/)

As in Japan, silk production in the Republic of Korea continues to decline, largely because of industrialization. Artisanal silk industry, being labour-intensive, has become too costly in these two countries and they now rely increasingly on imported silk to meet domestic needs. Japan remains one of the world's largest markets for silk products and its imports of silk products continue to rise. The Republic of Korea maintains ample silk-processing capacity; it is now importing silk yarn and grey fabrics to be finished for export. The quality of printing silk fabrics in particular has improved in the country and finished silk fabrics, ladies' silk scarves and men's silk neckties have been exported in higher quantities.

In 2000 Brazil's output was around 1,389 tons of raw silk. As a comparative newcomer to the silk trade, this value of production was about 40% or almost 1,000 tons less than the 2,360 tons attained in 1996 (http://www.tradeportalofindia.com/). The country's role as a supply source for Japanese silk processors has suffered a setback because of the declining demand for raw silk and silk yarn in Japan. The growing imports of finished silk products into Japan are gradually replacing local silk processing, i.e. silk weaving, dyeing and printing of silk and the production of silk garments and accessories.

2.4.1 Trade in Silk Fabrics

Silk fabrics are produced either using hand-looms or power looms. The bulk of the silk woven in China comes from power looms while production in Thailand and India is largely done on hand-looms. However, the use of the power loom is expanding nowadays; this is particularly so in India where the increasing domestic demand for 'saris' is justifying the increased use of this type of loom. Viet Nam continues to develop its silk-weaving industry, mainly on power looms. Practically all weaving in Brazil and the Republic of Korea is carried out on power looms (ITC-ITF, 1999).

Producers of silk fabrics in China and the Republic of Korea are highly dependent on fairly large export orders owing to the size of their production units. According to trade sources, one of the greatest advantages of Indian and Thai exporters is the willingness of their weavers to accept comparatively small orders, enabling the exporters to meet the highly specific requirements of their customers in competitive markets such as Germany. Experts in the field found that it has become essential to educate buyers/importers and, where necessary, consumers as well, about the slight variations in colour shades, the unevenness of the weave, etc. that occur in hand-loom weaving to promote silk trade in hand-loom fabrics.

2.4.2 Trade in Silk Textiles and Garments

It is difficult to assess the value of the world trade in silk garments and accessories as national trade statistics are either not standardized or not detailed enough. In most countries, for instance, silk garments are normally classified with garments of other fibres such as linen, cashmere and ramie. For the same reason it is practically impossible to find reliable global data on the value of international trade in hand-loomed silk fabrics. Especially in India and Thailand, the most experienced producers of this type of silk fabrics, the majority of silk

fabric exports are fabrics woven by hand-looms. Nonetheless, the international trade in silk textiles and garments can be safely regarded as a multi-billion-dollar affair. During the ISA Congress in Lyon in July 1999, trade sources indicated that in 1998 the United States retail market for silk products was estimated at some US$ 5 billion (http://inserco.org/en/).

Haute couture creations, which mean a fashion constructed by the hand without the use of sewing machines, go to a very small clientele; the bulk of the silk trade is directed to other consumer segments. The comparative scarcity of the raw material will have to be kept in mind when developing silk products for these segments of the international market. It is interesting to note that, according to trade sources, the number of regular *haute couture* clients in the world has declined quite drastically from about 300,000 before the Second World War to only about 1,000 today. In fact, several famous *couture* houses seem to be more successful in marketing perfumes and accessories than clothing. No doubt *haute couture* still maintains an important role in image building, but its overall significance is diminishing. After all, the number of clients who are willing to pay US$ 15,000-25,000 for a dress is somewhat limited. It is estimated that the *haute couture* industry currently employs only about 41,000 individuals.

2.4.3 Sand-washed silk and its effects on trade

During the 1980s, some New York-based entrepreneurs started testing and developing a silk fabric that would be crease-resistant, pre-shrunk and even machine washable. Fabrics were washed in machines with sand, pebbles, tennis balls and even tennis shoes. The end result, a fabric that was very soft, comfortable and, most importantly, easy to maintain (i.e. to wash and iron), became a huge commercial success. Sand-washed silk fit into the 1990s' vogue for elegant, comfortable sports and leisure wear made of natural fibres. Not surprisingly, therefore, imports of sand-washed garments into the West soared (Hyvarinen, 1999).

Traditionally, more than 90% of the world market for silk garments was geared to women's wear. Silk products for men were in the past largely limited to shirts, neckties, handkerchiefs, socks and underwear. The situation has changed significantly in the West, a direct result of the marketing of sand-washed silk. There was a wide range of sand-washed silk garments for men: trousers, jackets, padded winter jackets, bomber jackets, shirts, suits, shorts, T-shirts, etc. Some trade sources indicate that sand-washed silk may continue to have a future in men's clothing, but at higher quality and price levels. The public perception of the right time to use silk garments has also shifted, at least in the traditional European markets. Silk used to be reserved mainly for evening wear, but sand-washed silk has made the use of silk garments possible at any time of the day. Hitherto sold only in high-street boutiques, silk garments and accessories have started becoming available in departmental stores.

During the 1990s, other silk items made in developing countries were successfully launched in several Western markets. An example is thermal underwear from China, which was introduced some years ago in Canada and the United States. This product is sold through specialist shops to skiers, mountain climbers and the like. Its main sales points are the special characteristics of silk, which is cool in summer, warm in winter and absorbs moisture without giving the sensation of wetness. Knitted silk goods (T-shirts, camisoles, polo-neck sweaters and cardigans) have lately appeared in various European markets and in Japan. Knitted products of silk blended with cotton, linen, acrylic and viscose have been selling well in the middle price categories in Europe and especially in the United States. Luxury fibres such as cashmere, alpaca and camel hair are also blended with silk. There is a growing demand for

knitted products both in silk and silk blends. The main suppliers for these products are Italy and China. This goes very well with the present fashion for casual dressing and it is believed that this is the trend for the future in several Western markets (ITC-ITF, 1999).

2.4.4 International Suppliers of Silk

China is the dominant supplier of raw silk and silk yarn to the West. Many silk-producing developing countries are also heavily dependent on China for their basic supplies. The other main sources, but on a much smaller scale, are Brazil and Viet Nam. Certain countries use up their own output of raw silk; some of these supplement domestic supplies with imports from China, Brazil and Vietnam. India is a case in point: it is both the world's second largest producer of raw silk and the biggest importer of this material.

The finished silk goods marketed internationally in fairly recent times came mainly from Europe. Today, some developing and other countries/areas produce these goods for export on a large scale. China, India and Thailand are notable examples of comparatively new producers. Hong Kong (China), China and the Republic of Korea have been in the business of exporting large quantities of silk garments to Western markets for longer periods.

China's silk exports climbed from US$ 1.1 billion in 1986 to US$ 2.9 billion in 1993, then fell to US$ 1.62 billion in 1999 (Curie,2001). As mentioned earlier, the role of China in international trade in raw silk and silk products has undergone a fundamental change over the last two decades. It had replaced Japan as the world's largest producer of raw silk by 1978, with its share in world output climbing to more than 70% in 1998. Primarily an exporter of raw silk and silk yarn in the past, the share of these materials in its overall silk trade declined from about 33% in 1986 to around 10% in 2000. The country is now mainly an exporter of value-added silk products, with their share in the country's overall silk trade rising from 23% in 1986 to over 70% in 2000. The latter change was brought about by some American buyers who invented sand-washing as a softening treatment for silk fabrics, a treatment, which revolutionized the silk trade (ibid, 2001).

2.4.5 Imposition of quotas

The rapid increase of sand-washed silk exports from China to the European Union and the United States eventually, led to quantitative restrictions on both these markets. In the United States the restrictions were imposed after consultations between the two parties. In the European Union, they were imposed unilaterally by the European Commission in March 1994 (Currie, 2001). Fortunately for China and Hong Kong (China), the main suppliers, demand for sand-washed silk garments in the West had already peaked. The quotas, therefore, had somewhat smaller impact than originally anticipated. It is interesting to note that in these two markets Chinese exports were not considered a threat to the local silk-processing industries. It was particularly so in the United States, which has no domestic silk-processing industry to speak of. The threat arose from the fact that the cheap silk products were competing with products of other fibres, including cotton and even polyester. The quota restrictions in both markets are still in place; in the European Union both for Chinese silk fabrics and garments, in the United States for silk garments only.

It would seem that one of the essential challenges to the silk producers of today is to strike the right balance between the various segments of the market. The appearance of silk as a

mass product does not have to mean its disappearance from the middle and higher segment of the market. In fact, the increasing pressure in Europe towards the use of environmentally benign products may have a greater impact on international trade. This pressure, particularly strong among consumer groups in Germany, will continue to lead to stringent legislation on both production methods and end products. Legislation banning certain azo-dyes was introduced in Germany in 1989 and some other European countries have already (the Netherlands) or can be expected to follow suit (Roy, 2000). The new European Union criteria introduced in March 1999 for eco-labels for textiles and clothing also ban these azo-dyes.

2.4.6 Trends of Silk Consumption Today

Silk consumption in the developed countries seems to have stagnated over the last two decades . The market seems to be recovering from the 'democratization' of silk and new attractive alternatives for silk consumers are expected. Lately, two new interesting trends have appeared: first, knitted silk goods are increasingly gaining popularity; and second, the demand for blended silk fabrics for garments, both knitted and woven, is on a steady rise. One reason for the silk demand is probably demand inclination towards natural fibres.. Another reason is the availability of low priced made-up silk goods, which consumers in the middle-income groups can afford (ITC, 2002).

Per capita consumption of silk in Europe has traditionally been highest in Switzerland, followed by Germany and the United Kingdom. France and Italy, the two leading silk converters, have always had a somewhat lower domestic consumption figure, which indicates that production of silk products in these countries is largely geared towards export markets. Japan has long tradition in the use of silk and consequently the country has the highest per capita consumption of silk in the world. Although consumption has fallen in recent years, principally because of a drop in demand for kimonos, Japan's position is likely to remain unchanged as demand rises for other silk products. Over the past few years Japan's imports of clothing (including silk items) from China have increased considerably. This is not surprising since the suppliers are close to the market, allowing the Japanese specialists to visit the suppliers frequently. Similar cultural background also facilitates the growth of this bilateral trade. In 1998 Japan was the third largest importer of Chinese silk products, after Hong Kong (China) and the United States, totaling some US$ 280 million (Currie, 2001).

In India, domestic consumption, at 85% of production, is substantial. According to the market analysts, no significant rise in export trade is virtually possible in this country without an accompanying expansion of production. India was bound to prepare itself to open its doors to compete with products of silk and other fibres from external suppliers in the year 2005, when full implementation of the WTO Agreement on Textiles and Clothing (ATC) took place. This situation will be discussed at length in the succeeding chapter. However, a report before the MFA abolition phase indicated that the domestic demand for silk in China was rapidly increasing with rising standards of living, particularly in the country's coastal belts. The same was applicable to the Republic of Korea and Vietnam (Exim Bank, 2002).

2.4.7 Generic promotion of Today’s Silk

One of the organizations engaged in the generic promotion of silk is the International Silk Association (ISA) in Lyon, France. With members in about 30 producing and consuming countries, ISA mainly represents the commercial interests of silk industries and traders and is little involved in the development of sericulture. It has introduced the use of a silk mark for

fabrics and garments. Some people in the silk trade believe that activities leading to the development or adoption of a widely recognized silk mark, supported by active promotion, should be carried out. Not only should the mark serve to identify genuine silk products, but it should also act as a guarantee of quality. However, greater research seems to be essential in determining basic quality specifications for the mark and for standardized care instructions. Furthermore, producers would have to agree to conform strictly to all the standards (http://www.tradeportalofindia.com/SilkReviewByITC).

For a period of about 15 years the five major European silk processors had a promotional programme for silk in cooperation with China. This activity came to an end since the Chinese did not want to continue financing a campaign that did not specifically advertise Chinese silk. However, during the promotion period there were funds available for trade promotion at some leading retail outlets, such as Harrods in London. Some of the money was also used for brand promotion and information dissemination for consumers. However, silk producers and processors were not convinced that promotional activities for silk itself were required. Nevertheless during the XXIst ISA Congress in November 1997 in Bangkok, a proposal for the generic promotion of silk was tabled by the ISA Promotion Committee. There have also been occasional country-specific campaigns, such as the 'Silk at Heart' promotion in Japan in the 1980s, but today for all practical purposes no general promotional activity is carried out on silk and the promotion of silk and silk products is at present left to individual countries and enterprises. While activities on larger scale were discussed at international forums for several years, many showed interest in such activities as long as they would not have to provide the funds required (Currie, 2001).

2.4.8 Silk Ecology: A New Trade Barrier

Environmental and social issues were widely discussed in international textile and clothing circles. Western European countries, led by Germany, were becoming more and more demanding on such matters as production processes, child labour, social clauses, social labels and the use of dangerous chemicals and dyes. The trade itself had been slowly focusing on environmentally friendly products and production methods. Earlier, there there are no mandatory rules on eco-labelling, even though a host of eco-labelling schemes exist in many Western markets. In some countries, such as Sweden and Germany, several competing scenarios are available (Exim Bank, 2002).

Silk has a lot to offer in this respect: it is user-friendly and environmentally sound. Essentially composed of proteins, it is close to the human skin. It can absorb up to 30% of its weight in moisture, making it extremely comfortable to wear. From the point of view of the environment, silk has the advantage of being produced with few chemical fertilizers and practically no insecticides. These environmentally positive aspects have so far hardly featured in any sales campaigns. They should be vigorously used for the benefit of the international trade in silk products.

In March 1999 the European Union issued comprehensive environmental criteria for the use of European Union eco-labels for all textiles and clothing items. It remains to be seen how the manufacturers will react, since the previous European Union eco-label criteria for T-shirts and bed linen attracted only a handful of European manufacturers to apply for the label. It has to be kept in mind that the European Union eco-label is, like all the others, a voluntary label and using the label does not necessarily bring any clear benefit over similar competing (non-labelled) products.

In the Union, the life cycle of industrial products - 'from cradle to grave' – has become a matter of concern and their environmental effects before, during and after production are being subjected to scrutiny. One result is the bewildering array of competing eco-labelling systems created by different organizations with varying objectives in individual European countries.

Germany has perhaps been more active than any other European country on environmental issues. The health of consumers was taken into account by the Federal Ministry of Health's amendment of 15 July 1994 to the *Consumer Goods Ordinance* (which regulates all consumer commodities). The amendment bans the production, import and sale of any consumer goods containing certain azo-dye stuffs which, upon decomposition, produce any of the 20 amines suspected to be carcinogenic (*see* table 2.4). No garments or items which come into regular contact with the human body may be produced, imported and sold in Germany if they release harmful amines as a result of the use of these azo-dyes. The ban became effective in April 1996. The same rule is now also valid in the Netherlands for garments, bed linen and footwear (Currie, 2001).

The regulation has had an impact on silk producers and processors whether they operate for the German and Netherlands markets or not. While the free movement of goods within the Union would make it possible for one country to import the banned fabrics and produce garments for re-export to these markets, the German Ministry of Health, for example, can conduct random checks at the retail level to ensure compliance with the law.

Silk producers and exporters in developing countries are facing this Non-Tariff Barriers as a major challenge in expanding their trade in developed market. They are now trying to keep themselves informed through their business contacts in importing countries on the evolving regulations in their target markets. Such environmental compliance seems to encourage usage of natural dyes through out the world.

Table 2.4 Harmful Amines considered by German Regulations

Amines	CAS Number*
4-aminodiphenyl	92-67-1
Benzidine	92-87-5
4-clorotoluidine	95-69-2
2-naphthylamine	91-59-8
0-aminoazotoluene	97-56-3
2-amino-4-nitrotoluene	99-55-8
p-chloroaniline	106-47-8
2,4-diaminoanisole	615-05-4
4,4'-diaaminodiphenylmethane	101-77-9
3,3'-dichlorobenzidine	91-94-1
3,3'-dimethoxybenzidine	119-90-4
3,3'-dimethylbenzidine	119-93-7
3,3'-dimethyl-4,4'-diaminodiphenylmethane	838-88-0
p-kresidine	120-71-8
4,4'-methylene-bis-(2-chloraniline)	101 -14-4
4,4'-oxydianiline	101-80-4

4,4'-thiodianiline	139-65-1
0-totuidine	95-53-4
2,4'-toluylenediamine	95-80-7
2,4,5-trimethylaniline	137-17-7
* Chemical Abstracts Service Registry Numbers	

Source: Silk Review, 1997,2002 ITC-Geneva

2.4.9 Social Issues: Another Non Tariff Barrier

Social aspects of silk production and social accountability standards are much discussed in present international forums. SA 8000 is an internationally accredited label based on the principles of international human rights norms outlined in International Labour Organisation conventions, the United Nations' Convention on the Rights of Child and the Universal Declaration of Human Rights. The core areas covered under SA 8000 are child labour, forced labour and health and safety. It is important for all the firms to comply with international standards on such social issues to obtain SA 8000 certification. China accounts 40 percent of nationwide SA 8000 companies. India on the other hand, represents only 7 per cent of worldwide SA 8000 certified firms (Exim Bank, 2002).

The carpet importing countries of Europe are highly concerned about involvement of child labour in the manufacture of carpets. In order to eliminate exploitation of child labour, these importing countries brought in conditional imports of carpet involving guaranteeing of production without the use of child labour. In order to popularize this social clause, 'Rug Mark' label was introduced to guarantee child labour free carpet promoted by Indo-German Export Promotion Project, UNICEF and NGOs (ibid, 2002).

2.5 Conclusion

Genesis of artisanal silk industry in several nations across the world had shown its enormous power to connect far apart nations of the world with this golden yarn. The countries traded with each other for this high valued silk yarn and smothered cocoon and the civilization progressed holding the hands with silk trade in the timeline. The fashion statement of one part of the globe kept on changing with the varying weaving pattern of silk of another part of the world and again shifts in demand of one part of the human race helped to change the production technique of silk fabrics of another part of the earth. The East Asian countries (which includes China, Japan, India, Korea, Thailand) were the principal suppliers of the raw silk while the same yarns and cocoons were woven with new style in Italy, Franca, England for consumption as well as re-exportation to East Asian countries. European countries were called silk-converter countries for this reason. However, the improved reeling technology and weaving pattern of West taught the artisans and weavers of East and their rudimentary methods were substituted by technologically developed procedures overtime.

Through aforesaid sections we have explained numerous historical incidences and legends of several nations with whosoever this royal yarn is attached. We came to know how this royal yarn bound two distant economies China and Rome together and how the interconnecting routes have changed the shapes of several economies. The mystery which was hidden from the world by China for several millennia through frequent administrative coercive restrictions had led to several fascinating legendary stories about how the secret was stolen or transacted to different countries in the world. The Silk Road itself became famous not only for transacting silk but for exchanging goods of different categories and moreover the culture

between East and West. Worldwide demand for this exotic fibers and its excessive value had prompted merchants across the globe to fill their coffer into silk. Timeline incidences have acquainted us with those enigmatic historical moments where silk tissue and silk production attributed a major role. At the last section, the present situation of the Silk Trade was discussed at length especially with response to the introduction of various kinds of Non-Tariff Barriers. China remained the dominant traders and production supremacy has been converted into leading suppliers in the world market. While in case of India the export prospect seems to be dull not only because of its excessive consumption bias but also due to lack of quality standard required to capture markets of developed economies..

This chapter bypassed the historical genesis of artisanal silk industry in India as the plan of study put major emphasis over the foreign markets here. The next chapter would elaborately focus on the issues explaining how intricately this golden yarn used to weave trade, production and culture of India. Bengal Silk which was the name of the then Indian silk will be discussed at length along with illustration regarding the time horizon when English East India Company strived hard to exploit the potentials of silk production in Bengal for own commercial interest.

Endnotes:

1. Bombyx Mori, which means blind and flightless, is the name of mulberry silkworm
2. The commodities which were traded through silk Roads are Silk, Gold, Spices, Metal etc.
3. Tussah Silk is wild silk. Muga, Eri, Tasar are few varities of wild silk.
4. Several popular legends are found regarding smuggling of silk from China to Khotan , among which the most trendy is the stealing silkworms by the Chinese Princess within her hairdo while she was married to a Khotan Prince.
5. See Richthofen, Ferdinand Von. (1877-1912). *China. Ergebnisse eigener Reisen und darauf gegründeter Studien (* Results of A Personal Journey and Studies Based Upon It). 5 volumes, Berlin: Reimer.
6. The Byzantine Emperor was the term used to label the later Roman Emperor (Specially The Eastern Roman Empire, whose base was Byzantine). They were the Greek Speaking Roman Empires, having multi-ethnic characteristics and reigned during 330 AD-1457AD.
7. Byzantium was the name of the city of Constantinople
8. The victory of Muslims over China at Talash River (in Northern Turkestan) in 751AD led the diffusion of sericulture technology to Arabs through Chinese prisoners, many of whom were sericulturists.
9. Zheng Ho was a poor Muslim boy from a rebel family of south China who was castrated at the age of ten years in prison. His struggle for existence made him memorable in the timeline of History.
10. Elagabulus was the first Roman Emperor who was famous for his outrageous transsexual behaviour and his fondness towards silk fabrics. He was the first Roman Emperor to wear clothes entirely of silk.

11.Yo-San-Fi-Rok: I'art d'lever les vers a soie au Japon par Ouekaki-Morikouni,tr ans. J. Hoffmann, annotated by M. Bonafous (Paris and Turin, 1848); see also Uekaki Morikuni, Yosan Hiroku (1803), reprinted in Edo Kagaku Koten S6sho, vol. 13 (Tokyo, 1978)

12. Great Depression in US market had affected Japan particularly as the sharp decline in export prices for agricultural goods occurred from 1929 onwards. Japan's agricultural depression began with fall in silk thread prices in May 1930, which led immediately to a fall in cocoon price. This phenomenon has been identified as 'Silk Crisis' in Japan. For details see Wilson, Sandra (2003) : Manchurian Crisis and Japanese Society, Routledge.

13 'Book of Han' is a classical Chinese history finished in AD 111, covering the history of China under the Western Han. The book was composed by Ban Biao, Ban Gu and Ban Zhao.

14. 'Lua Van' is name of a special dress which means silk clouds. It billows like a cloud.

CHAPTER: 3

GENESIS & GROWTH OF ARTISANAL SILK INDUSTRY IN INDIA (with special reference to West Bengal)

3.1 Introduction

In the preceding chapter, genesis of silk has been elaborately discussed for across the countries in the world. The mysterious power of this magic yarn which kept on weaving the economic and commercial relations between countries of the continents has been found worth illustrating. Against this backdrop, the present chapter will unravel the history of Indian artisanal silk industry and its growth down the timeline up to the period of Independence. As the core area of this research concentrates on artisanal silk industry of West Bengal, the major line of discussion in this chapter will ultimately converge to the history of Bengal Silk.

In the foregoing chapter, it has also been mentioned that Chinese silkworm *bombyx mori* was smuggled to India during 2nd and 3rd centuries BC though literary evidences of *tussah silk* was found much earlier in the foothills of the Himalaya. However, with the archaeological excavations in two sites of Indus Valley civilizations during 1999-2000, researchers started thinking about the origin of silk in Indian subcontinent in a different dimension. The volume of artifacts amassed from these two sites strongly indicates that silk manufacturing in India was equally prevalent like China and dated back to 2450-2000 BC (Ball, 2009). Fine structure of silk strands were observed in the necklaces and bangles excavated from these sites , while the precise shape of the individual silk threads determined the shape of the orifice through which they are executed. These also provide clues regarding the species of silk moths that produced the strands. Researchers show that Harappa and Chanhu-daro samples contained silk from species of Antherra moths indigenous to South Asia (Good et al., 2009). The silk fibers found in these excavations were processed using similar process of degumming and reeling as that of Chinese. Scanning electron micrograph, it has been found that some fibers were spun after the silk moth was allowed to escape from cocoons[1].

The artisanal expertise in Indian silk industry, especially in brocade weaving, was initially inculcated by Parsis in Gujarat, who had been migrated from Southern Persia (Faristan). Parsis came from the area of the Persian Gulf that was better known for its high quality pearls. They used real pearls in their manufactured silk embroidered fabric. The influence of this Gujrati silk-art work pervaded the rest of Indian silk industry in extensive manner. The silk weaving centers started developing in and around the capitals of the kingdoms and around the holy-cities where people from affluent sections either dwelled or traversed. Along with these artisan classes a rich merchant class also developed who contributed substantially in developing of these artisanal silk with their advance capital. In subsequent sections of this chapter the changing characters of these native capitalists and their relation with silk artisans will be illustrated with the changing passage of time. However, in the beginning their role seemed to be like a patron who sincerely desired to contribute with positive attitude. We will discover how the attitude of the middlemen changed with time. The ancient silk weaving centers were situated in Lahore, Agra, Fatepur Sikri, Varanasi and Murshidabad, other than Gujarat and Malwa and South India. However the historical trajectory of this artisanal growth of silk industry will be discussed in the subsequent sections of this chapter with special reference to Bengal artisanal silk sector.

Section 3.2 will elucidate the genesis and growth of sericulture and silk industry in Indian subcontinent starting from the ancient period to pre-British East India Company's arrival to India, while the following section 3.3 will at a time illustrate the problems and prospect of the artisanal silk industry during the period of British traders (1612-1757) and also for the period of the Company Rule (1757-1858). The subsequent section 3.4 will explicate the situations of Indian Silk Artisans at the background of the changing global trade prospect. Section 3.5 will

illustrate the status of the silk weavers and artisanal classes across the country in colonial period while section 3.6 will concentrate on the Bengal silk industry and especially the rise and fall of economic situations of Bengal artisans as a resultant impact of British colonial policy. Section 3.7 will conclude the discussion elucidating a comprehensive picture on the over-all growth of the sector up to Indian Independence and commencement of economic planning where special emphasis had been given on priority sectors.

3.2 History of Silk Manufacture & Trade in India before the Arrival of British Traders (up to 1612)

As mentioned earlier, there exists an ambiguity regarding the origin of sericulture in India (Charsley, 1982). Commentators have remarked that perhaps wild silks (e.g., Muga, Eri, Tassar) were produced in ancient India since time immemorial. Literary source of Vedic Period (c. 1500BC-500BC) and Epic-Purana Period (c. 200BC – 700BC) like Rig Veda, Ramayana and Mahabharata had indicated about silk. The earliest religious scripture 'Rig Veda' mentioned "urna", generally translated as some sort of silk (Dutta and Nanavaty, 2007), while another sacred law-book 'Manusmriti' referred to clothes made of silk and the great ancient Indian epic Mahabharata explained silk clothes as one of the array of luxury items brought to the court of Pandavas after their conquest of the kingdom. Again, King Yudhhisthhira received clothes woven from thread spun by worms as a gift from feudatory Princes. There are illustrations of the fabric in Ramayana too. The wedding gifts of Sita included among others 'fine silken vestments' of diverse colours. All these literary evidences point to the origin of silk (not mulberry but wild silks) in India by 1300-1400BC.

According to certain historians, the cultivation of silk first began in the sub-Himalayan areas flanked by the rivers Brahmaputra and Ganges. N.G. Mookerjee (1919) in his book 'Genesis of Silkworm' said that domestication of sericulture originated somewhere at the foothills of Himalayas (Dutta and Nanavaty, 2007). The Aryans discovered the silkworm in these areas of Sub-Himalaya. Chinese and other Turinians found it in the ultra Himalayan regions and Semitics in the western Himalayas beyond Kashmir. However, some other commentators believed that mulberry sericulture might have entered India through overland routes from China around 140BC via Khotan (Ray, 1995).

References were cited by Banabhatta, the famous court-poet of King Harshabardhana (AD 606- 648), about the glories of silk in India during the time of early Christian era. King Harsha had decorated his entire palace with rainbow coloured silks at the time of the wedding of his beloved sister Rajyashri. That was the richness, love and tradition of Indian silk during the reign of Kings in the past. During medieval period (800AD-1800AD) silk production was practiced in India as a dependable livelihood in Kashmir, Bengal, Mysore and other parts of India. Silk production was also greatly patronized under Mogul Regime in India (1526AD-1857AD). The writings of many medieval historians contain frequent references of silk industry and sericulture. Mirza Haider (1499 -1551) in his 'Tarikh-i- Rashidi' refers to large number of mulberry trees among the wonders of Kashmir. Similar references are found in 'Ain-i-Akbari'(Constitutions of Akbar) in 16th century. In Akbar's court, Kashmiri shwals and woven silks were quite popular. As a matter of fact, Gujarati silk manufacturers and artisans were brought to the royal workshops in AD 1572 by Emperor Akbar. He took an intensive initiative to supervise the royal textile workshops at Lahore, Agra and Fatepur Sikri where skilled immigrated weavers from different background used to work together. The intermingling of their creative techniques brought about a great transformation in the artisanal

silk industry of India. The exquisite latifa buti was the outcome of the fusion of Persian and Indian designs.

During 14th and 15th century, Moors (Medieval Muslim inhabitant of Morocco) used to export Kashmir and Bengal silk from India to European market (Nananvaty, 1990). But the Bengal silk failed to make any big dent in the European market by that time (Foster, 1622-23). During the 16th Century, commercial production of silk had been started in Bengal by the last ruling Sultan Hussain Shah. However, prior to 1650 the Dutch company traded Bengal silk involving not greater than 10,000 rupees per annum (Om Prakash, 1988). During that period, performance of English company was even worse than Dutch Companies, i.e., not more than 17 percent of their meagerly invested capital in this trade in 1651 (Balkrishna, Commercial Relations, p 99). When the British company came in India in 1612 AD, they found silk as a potentially flourishing trade. The East India Company set up trade centers at ports of Surat and Maslipatnam and a filature of silk at Patna. Later, Kassimbazar and Murshidabad in Bengal became major of hub of silk trading in India.

Meanwhile, in Gujarat, a rich section of middlemen developed between the village artisans and traders, who were known as *dadani* merchant or silk merchants. These silk dadani merchants were having inward-looking approach and they never tried to venture the procurement and overseas interests at a time like Surat, Malabar and Coromondel Merchants (Mukherjee, 1994). These local merchants were actually intermediaries between native producers of raw silk and the exporters of raw silk and silk textiles. They used to receive the advances from Asian or European export merchants and distributed them to rural poor producers. At the time of harvest, they collected the raw silk from those poor producers and brought it to manufactories (*arang*), where export merchants could get the raw silk rewound and sorted by local artisans before sending it to European market (Chaudhury, 1995). From the third decade of the 17th century (with the expulsion of Portuguese forces from Hugli by Mughal forces), the influx of Gujrati merchants in Bengal became vibrant. Bengal-Surat trade developed directly in this century bypassing Coromandel ports, but the control of trade was more in the hands of Surat merchants and their Bengali agents (Chaudhury, 1971; Arasaratnam, 1987; Marshall, 1987). Thus up to mid 17th century, the Bengal silk industry was mainly sustained under the aegis of domestic traders (besides Gujrati traders, there were other merchants from Lahore, Multan, Benaras, Gorokhpur, Hyderabad, Delhi, Benaras and Agra) , who traded Bengal silk in Agra, Delhi, Lahore and Surat etc. The mid of the 17th century witnessed a strong connection between North India and Bengal Economies through inter-regional silk trade. John Kenn of British East India Company wrote in 1661 - "*According as the silk sells in Agra, so the price of silk in Kassimbazar riseth and falleth. The exchange of money from Kassimbazar to Patna and Agra riseth and falleth as the silk findeth a vent in Patna and Agra*" (Wilson, 1895). However, the market of this exotic fiber was still not large enough due to lack of sufficient traders and their ignorance about the market price of distant places. India's domestic market was also restricted due to ban on indiscriminant use of silk-clothes during the Mughal period.

In the international market silk trade was mainly governed by Italy and France till the 17th century. During 1619-1622, there was an accelerating trend in silk price due to Mediterranean crisis and famine of Italy (Ball, 1977; Romano, 1985; Cipolla, 1976). To meet the demand gap, Persian silk started dominating the market. However, that too had stopped after 1650 due to severe internal political disturbances in those regions. That was the time when the Dutch traders started importing Chinese silk and a cheaper substitute of that, i.e., Indian Silk, to

European market, which ultimately made Kassimbazar (now in Murshidabad district of West Bengal) a famous silk hub in the history of silk trade.

Cheaper price of Bengal silk was explained by several historians in different ways. The most common explanation was the provision of low cost economy. Bengal could easily afford all necessities of life almost at a price that was half of that in other parts of India (William Foster, The English Factories in India, 1634-36). Another explanation might have been the employment of family labour in the industry – the engagement of artisans' wives in winding and spinning and their children in sundry affairs (Robert Orme, 1805). Involvement of family labour gives the Bengal artisans a cost advantage to make their products exportable. During 1635 to 1650, the volume of silk exports from Bengal to European market had risen from 15-20 thousand pound to 50 thousand pound. The year 1693-94 was marked as the highest volume of silk exportation from Bengal to Europe by the Dutch traders. Bengal silk accounted for 57.8% of the total Dutch exports to Europe and 37.3% of total Dutch exports to Japan (Prakash, 1985). The Dutch merchants introduced Bengal silk in Japan's market in the late 17th century (ibid, 1985).

European trading houses were ignorant about Bengal silk even in the second decade of 17th century. A letter of English factories in 1622-23 indicated, "*Wee are glad we are acquint of further search after Beng silke, whereunto wee were somewhat engaged, for beinge (m)isleed through a veyne promise of an unable merchante to write of some large hopes of good quantetyes procurable in these parts, which after soe longe expectaction vanisheth into smoke, for here seldome comes anye eyether in itts quantety or condiction worth the surveigh…*". [Letter of W.Methwold and F.Futter at Masulipatam to Surat, in William Foster, The English factories in India, v.2, 1622-23, c.2]

According to another study (Master, 1911), the EEIC was investigating the possibilities of buying Bengal silk instead of Surat silk mainly due to cheaper cost of the raw silk. In the 1620's, the commercial mission of Hughes and Parker was to ascertain the commercial value of Bihar and Bengal silk. They reported back to their superiors that the best silk came form the vicinity of Murshidabad, where silk could be bought 20 percent cheaper than the rest of India. Thus within the mid of 17th century, history witnessed East India Company setting up their permanent silk factories in Bengal. They established silk factories in Baulia, Kumarkhali, Kassimbazar, Jangeepur, Malda, Radhanagar, Sarda, Rangpur, Sunatia, Haripur, Shantipur and Sonamukhi. They competed with Dutch companies for control over the supply of Bengal Silk in European market. They started filling their coffers with raw silk. They set up their trade centers in parts of Surat and Maslipathnam and a filature at Patna to decentralize the location of sericulture.

British East India Company was very much eager to exploit the inner potential of Bengal silk artisans in world market. They identified mainly two shortcoming of Bengal Silk- (i) the presence of different sorts of the threads in the same skein; and (ii) the fact that Bengali artisans did not cross filament of cocoons when they reeled the silk which made the silk lacking of roundness and lightness. In order to increase the volume of sales of Bengal silk, the Court of Directors drastically changed the Bengal reeling technology. In 1769, the company contacted with experts to introduce Piedmontese-technology to Bengal sericulture (Davini, 2008). The introduction of Piedemontese reeling method brought about a revolution in both Bengali cottage productions and marketing organization. To assess the impact of this Piedemontese technology, Moioli (1981) explained that Mediterranean low quality silk was driven out from the London market as the first wave of panic of this British experiment with

Bengal Silk was spread to the areas like Lombardy, the lower Rhone Valley, Calabria and Valencia. In 1681 the company invested £ 230,000 in Bengal Silk Industries. In 1698, Bengal silk fetched a peak price in London as the silk crop failed in both Italy and France. Within 1740, the English East India Company (EEIC) emerged as a greater trading company as compared to Dutch. The year 1813 was marked as the end of the monopoly power of the East India Company in terms of trade. But Bengal silk was still reigning in the export-basket of British traders.

Regarding British silk trade Bal Krishna(1942) remarked, "*This trade was, in fact, so vigorously pushed up that during the next five years [1680-81 to 1684-85] an unparalleled advance was made in the quantities to be procured in Bengal. In the earlier or subsequent history of the Company up to the Battle of Plassey(1757), such extensive amounts were ordered.*" [Bal Krishna, Commercial relations between India and England, London, 1924, p.142]

The French Company also appreciated the merits of Bengal Silk yarn. In a letter written in 1660's Berneier[2] urged the French to concentrate on Bengal silk, that according to him would be as good as Lebanon Silk or Syria Silk with little improvement (*Indes Orientales : Correspondence General, 1666-1676).* However, the access of French traders to the Bengal silk market was not as vibrant as Dutch and English traders in the pre-colonial era.

3.3 Problems & Prospects of Artisanal Silk Industry during British Traders & Company Rule (1612-1858)

To begin discussing the situation of artisanal silk industry during the period 1612-1858, it is important to explain the rationale behind choosing this reference period. In fact, 1612 has been chosen as it demarks the arrival year of the British East India Company in India. As English East India Company (EEIC) played a dominant role in changing the trade and commercial policies of the country as a whole in later period of time, so it would be worth analysing to explain the growth of artisanal silk during this period. During 1612-1757, the East India Company set up various factory towns in coastal India with the consent of the native states mainly to strengthen its business interest while its competitors were Dutch and French companies. While after the Buxar war in 1764 and Battle of Plassey in 1757, it virtually became ruler of the Presidency and continued to remain so till its cessation of power by British Monarch in 1858. During 1757-1858, EEIC had adopted several policies to improvise the artisanal silk sector though the consequential adverse impact could never be undermined. This section would attempt to portray the chronological progress of the artisanal silk sector during the period 1612-1858. While the developments of Bengal Silk in the 17th century has been discussed in the preceding section, the 18th and 19th century development are explored below.

During 1870 to 1930, a national market emerged in a number of basic goods and services that were imperfectly traded before. Agricultural goods were amongst them. Labour which became more mobile than before was another. It was opined by many economists and historians that India's history and political economy was overwhelming and more powerful during this time. Handloom weaving industry was deeply influenced by the exposure to import substitutes. It was also explained by several commentators that industrialization in Britain meant deindustrialization for her colonies. There was a sharp contrasting view which states that creative impact dominates. In either view, the dominant source of change was long

distance trade. The sixty years between the opening of Suez Canal (1869) and the Great Depression (1929) witnessed an almost continuous growth of external and internal trade and changes in the nature of trade in India. Foreign trade became an immensely more powerful economic variable than before. Exports expressed as a ratio of national income increased from small amounts in pre colonial period to 10-11per cent in the inter war years. This ratio has been assumed to be a rough ratio of the importance of trade by many experts. In 1925, it was about 11 per cent of national income. The value of exports increased fifty times during1835 to 1925 and possibly over a hundred fold between 1760 and 1925.

However, raw silk production in India (precisely, in Bengal) continued to be an independent peasant activity and free from supervision and control by any higher authority, starting from its commercial introduction in 16th century till the adoption of Italian technology (Piedemontese technology[3]) in 1769, by the English East India Company (EEIC), The activity was dominated by a large section of poor farmers and sericulture artisans, applying rudimentary method of production and lacking sufficient capital to invest in it. The peasants harvested cocoons four to five times a year and the mulberry was cultivated on the best of the lands. The use of family labour made the activity more intensive despite having several quality related loopholes. The next stage of operation was reeling, which was again under the control of peasant-artisans (mostly the same person). The artisans had two choices regarding this particular activity. They could either use their own family labour (especially the domestic women) to reel the yarn or they could have them reeled in *Putney* by *Cuttani* (the reelers visiting the village market) during the harvest season. In *Putney* cocoons were reeled and then the merchant's agent brought them in manufacturing centers *(arang*) to rewind and sort it by the winders (naccuds) (Williamson, 1775; Mukherji, 1903).

The silk artisans of India (precisely of Bengal Presidency[4]) faced several hazards starting from lack of usury capital, technical know-how and quality-control supervision to external intrusion which acted as a hindrance in the development of sericulture as a dependable livelihood during the colonial period. The problems can be categorized under following heads:

- Incursion of Maratha (1740), Bengal Famine (1768-69) and intensive flood of 1787 hit silk areas particularly very hard. The Marathas had exclusive intention to destroy the silk centers of Bengal Province (Dimock and Gupta, 1965).

- Capital insufficiency was another reason which made the poor artisans getting exploited in the hands of *dadni*[5] *merchant.* EEIC was successful in conquering most sericulture artisans through a commercialization process imposed upon a subsistence domestic economy by making him dependent on usury capital (Davini, 2008). From 1790 onwards these artisans were forced to sell their cocoons to company's agents at a very low price. They were compelled to accept the lower price of the company because they had to pay higher rents for the land of mulberry cultivation. The silk artisans were left with no choice other than the market relation with EEIC (Mukhopadyay, 1995).

- The Bengal silk artisans failed to produce quality silk due to lack of supervision and quality control by the authority. During the Mughal and Nawabite period, the state's interest was centered around revenue collection from mulberry land. The merchants and bankers were interested about marketing and exporting and never tried to intervene in quality augmentation procedure. *Zamindars* and *taluqdars* preferred to cultivate rice

instead of mulberry and collect taxes from peasants on behalf of government (Dutta, 2000).

- Fluctuating costs of alternative crops made the sericulture farmers unsteady with his production. The farmers kept on changing his production crops which affected the expertise of the artisans and their power of precision with certain specific skill required in silk production. According to Chowdhuri (1998) peasants' decisions to enter and exit from the silk sector were purely rational as they wanted to allocate their resources in the best possible way. But this fluctuating behaviour had degraded the intensity of silk production by artisans to considerable extent. For example, at the beginnings of 1780, the peasants who entered the silk sector because of EEIC's lucrative offer a decade ago, decided to stop the production of silk.

- During the late seventeenth and eighteenth century (1689-1763), the war between France and American colonies had affected the EEIC's decision about investment in silk production. The rice shortages in Northern India at the same time raised the price of rice. This induced many farmers to reconvert their lands for rice production.

- EEIC decided to introduce the Piedemontese technology in Bengal in 1769, but the Bengal Famine (1768-69) had taken away one-third of agrarian Bengal population which made the technology temporarily ineffective for the labour scarce economy of the then Bengal. However, from 1789 to 1822, the Bengal population has shown an impressive growth rate of population from 22 million to 37.6 million (Bose, 1993).

- The village money-lenders (or *mahajan)*), who were inserted in the official list of intermediaries, made the life of sericulture farmers miserable to a greater extent. These *mahajans* were protected by the Company against any social injustice they had committed. They used to charge higher rates of interest on exchange of several consumption loans and the poor farmers usually got trapped in these loan net. Like company intermediaries the *mahajans* used corporal force to confine farmers incase they failed to give their produce. These kinds of torture led to inter-regional migration of farmers in many areas (WBSA, BoR, 1791).

3.3.1 East India Company's Incentive Policy for Sericulture Artisans

In order to encourage the sericulture farmers, especially in the context of depopulated Bengal economies, English East India Company (EEIC) introduced some policy incentives in their Regulation 1972. The company explicitly affirmed that coercion policy would not be exercised. The peasants who decided to enter the sericulture sector would receive favourable rent. This regulation contributed to the increase in mulberry cultivation in 1770.

In 1789, following the devastating flood in Bengal, a similar situation of diminishing sericulture interest was observed among the Bengal peasants. The company again tried to convince the farmers to return to sericulture by proposing the same regulation as in 1772. The most significant observation in this context is that the farmers this time clearly understood the policy of incentives better than before and they bargained for cash incentives (*taqavi)* this time (WBSA, BoR, 1789). Peasants became prudent enough to deal with these incentive policies in the context of depopulated areas. Very often they filed grievance petitions to the Collectors of Districts giving subtle threat of leaving their abode which was again sent to Board of Trade or Board of Revenues. Thus the peasants were able to turn the political economy of external power to their own advantage.

3.4 History of Silk Industry in India during the Colonial Period (1858-1947)

This section will elucidate the growth trajectory of the artisanal silk sector in India especially during the period under the British Raj, which commenced after the Indian Rebellion of 1857 and subsequent transfer of administrative right from EEIC to the British Monarchy. Though the process of extension of market economy had begun from early decades of 19th century, it gathered momentum only after 1850. Around this time the colonies of Europe were turning into suppliers of food and raw materials for the sake of the on-going industrialization process in Europe (Roy, 2000), while raw silk sector was one of the leading sectors for India. Peasants, artisans and merchants responded positively to this decision which resulted into increased export oriented production.

Around 1860, the usual unit of operation in weaving was the household, where the adult men were working as weavers and adult women on winding and sizing the operations and children as assistants in both weaving and winding. These factories employed mainly migrant labour and made money out of silk trade (ibid, 2000). Capital and labour involved in these silk manufacturing industries became increasingly mobile and there was migration from rural regions to new points of trade, as evidenced in Burhanpur and Surat. The weavers usually used to come from depressed or over populated regions.

However, from 1873-74 onwards the price of Bengal silk continued to fall in the international silk market and gradually the silk industry diminished down to nowhere before the end of the British colonial period. Though Bengal and Kashmir silk artisans shared the same fate of decline, the worsening situation of the former was greater than the later. On the other hand, the sericulture started rising with new vigor in Mysore under the supervision of Tipu Sultan during 18th century. Tipu made Mysore a leading silk producing state and took help of the foreign government to train artisans. Hanumappa and Erappa (1988) had elaborated how sericulture fuelled the rural artisans in this princely state. The technology was transferred from Bengal. Japanese and Italian silkworm strains were imported and experts were also hired from these countries (Navanty, 1990). Spread of disease during 1866 and the world depression in 1929 along with competitions from imported silk and rayon lead to downfall of Indian Silk Industry on the eve of World War-II. A tariff protection commenced from 1934 to save the industry from cheap imports of silk (National Commission of Agriculture, 1976). During the Second World War there was a temporary boom in the Indian silk industry due to the demand from the Allies for silk manufacture of parachutes. However, genesis and growth of silk sector in India would remain incomplete without illustrating the history of Kashmir silk, which will be taken care in the following subsection.

3.4.1. History of Silk Production in Kashmir

Kashmir had been the birth place of Indian sericulture in the 3rd and 4th centuries AD (Federico, 1997), though no well documented clarity was found whether the silk was home-woven or imported from China. The first documented silk in Kashmir was located in the praising words of the famous traveler Hiuen Tsang who visited India during 630-643 AD.

According to him, prevalence of mulberry sericulture was observed in Kashmir and the industry received adequate attention from the rulers and the governments.

However, since then the industry had decayed so much as to almost disappear till the period of King Bad-Shah. With the annexation of Kashmir by Mughal Mirza Hyder in 1540, the silk industry continued to produce quality product. After the Mughal Period (1585-1750), the silk industry again plunged into crisis as royal patronage of Afghans (1750-1842) was not similar like Mughal Emperors. Thus in the absence of institutional support and organizational capacity, the silk industry in Kashmir stagnated.

Under the British colonial rule, India's silk export-coffers were mainly filled by Bengal silk and partly by Kashmir silk. During 1823-1828, export from Bengal to England rose to 5.5% while considerable progress had been observed in production of Kashmir silk too (Federico, 1994). By 1835 the British East India Company ran over hundreds of filatures and exported 400 tons of raw silk. Maharaja Ranbir Singh was often credited for revival of sericulture in Kashmir. A modernization plan was first implemented by him in 1869 (Geoghegan, 1872). Receiving royal patronage private companies took over in the export trade and the Kashmir silk boomed in foreign trade till the 1870s when Bengal lost all of its foreign markets due to outbreak of silkworm epidemic diseases and technological stagnation.
In 1870, two filatures with 470 reels were set up at Raghu Nath Pura (Naseem Bagh) and Cherapura near Srinagar. About 127 houses for rearing cocoons were built there and the rearers were given special support for receiving cocoons. The Government owned the mulberries, distributed eggs, withdrew the cocoons (as penalty for the peasant incase they failed to reach the target), processed them in its own reeling plants and sold the silk. The system was devised to guarantee the silk growers and artisans a safe outlet for their cocoons and to maintain a high quality standard.

While the industry was showing signs of progress, pebrine, a silk-worm disease caused great devastation to silk worms in 1878. Due to spread of infectious disease of the silkworms in large breeding houses the silk project in Kashmir was abandoned after three years. It was resumed in 1890s with the style of centrally planned economy. All stages of production were under strict control of the British Government and its recognition to International market was well established. In 1892, the silk industry in Kashmir was organized on modern lines as a state enterprise under the leadership of Sir Walter Lawrence. In 1903, Mr. Thomas Wardle, an English sericulturist made a detailed survey of the industry and suggested various lines of improvement. Accordingly, machinery was purchased from Italy and a factory was set up at Rambagh in Srinagar. During the rule of Maharaj Pratap Singh (1905-1925), the silk industry of Kashmir underwent a drastic change and was exposed to modern and scientific approach. By 1907, ten filatures were set up and the artisanal industry was able to provide employment to 60,000 people who in turn used to generate silk income worth of £ 100,000. Despite the damage caused by fire to the silk factory in 1907 and 1913, the profits of Kashmir Silk factories went up from Rs. 3.6 lakh in 1902 to Rs. 12.5 lakh in 1919 (https://thecherrytree.in/once-the-largest-silk-factory-in-the-world/). This helped the Kashmir silk to push out Bengal silk from the South Asian market. Kashmir and Bengal silk started competing with each other and Mysore silk also became famous. Again, in 1908, for the first time in India the reeling of silk industry was done by using hydro-electric power. Kashmir silk received recognition in Western market and in 1910 nearly 50,000 households in Kashmir were involved with silk growing and about 80 tonnes was produced that year (ibid, 1997). Sericulture department in Kashmir earned huge profit immediately after the First World War.

However, from the second decade of the 20th century competition between China and European markets accelerated while the Great Depression further worsened the situation. Again, demand for silk was generated during Second World War which resulted high profits for the sericulture department. In 1937, the Rajbagh silk weaving factory was in full bloom. Thus by 1942, Kashmir had the largest silk factory in the world while quality of produced silk was comparable with those of Italy and France.

3.4.2 Trends in Export of Indian Silk vis-à-vis Global Trends (1820-1947)

After the closure of monopoly of English East India Company in1813, all British citizens were allowed to trade with India. Therefore analyzing the export trends from 1820 onwards would reveal the changes in trade pattern and volume from the previous era, i.e., during the monopoly era of EEIC. Again, we would like to segregate this time period into Company rule without monopoly in trade (1820-1860) and direct British rule (1860 to 1947). On August 2, 1858, the British Government passed the Government of India Act, through which the authority of India had been transferred from English East India Company to the Queen of England. Therefore the latter period would indicate whether direct British rule supported or ruined the Indian silk artisans in building trade relations with other nations. As a matter of fact, the Suez Canal was opened in 1869 which reduced the sea passage from England to India to three weeks in stead of three months. British women started coming to India and began forming their own society separate from the native society in India. More and more British goods were imported which started destroying many Indian crafts including silk.

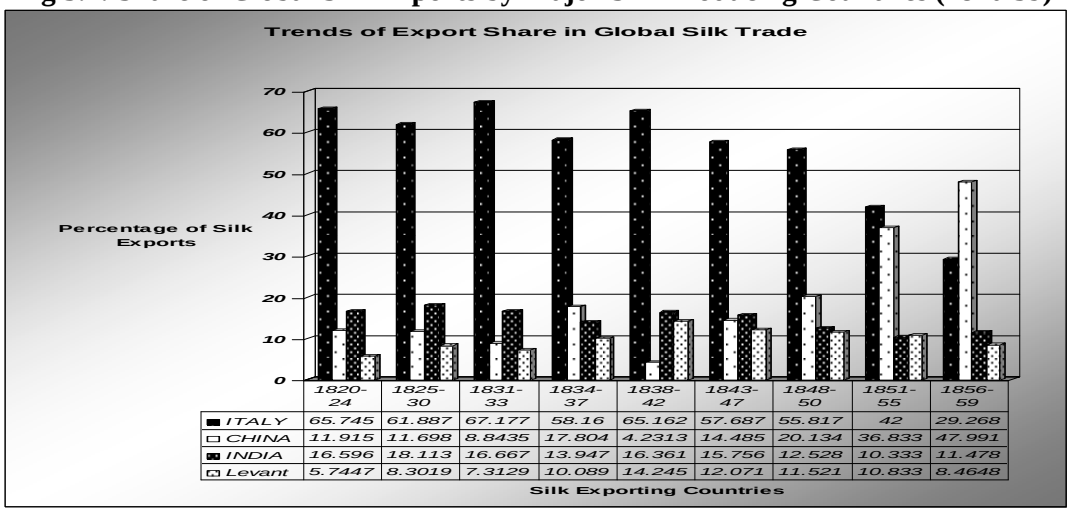
3.4.2a Trends of Silk Exports in India vis-à-vis Other Major Exporters during 1820-1859

During 1820-1860, the global demand for silk had increased from 23.5 thousand quintals in 1820-24 to 69.5 thousand quintals in 1856-59 (See Fig-3.1). With the expanding global demand for silk, China's share in global silk trade had risen significantly while Italy had shown a steep declining trend. India's export trend during this period had shown a fluctuating trend that hovered in the range between 11 to 18 percentage share of the global trade. Levant (Mediterranean Arab) had shown a marginal upward trend in its global share in silk trade. (See Fig3.2).

Fig-3.1Global Exports of Silk Goods during 1820-1859 (in quintals)

Source: Federico (1997)

Fig 3.2: Share of Global Silk Exports by Major Silk Producing Countries (1820-59)



	1820-24	1825-30	1831-33	1834-37	1838-42	1843-47	1848-50	1851-55	1856-59
ITALY	65.745	61.887	67.177	58.16	65.162	57.687	55.817	42	29.268
CHINA	11.915	11.698	8.8435	17.804	4.2313	14.485	20.134	36.833	47.991
INDIA	16.596	18.113	16.667	13.947	16.361	15.756	12.528	10.333	11.478
Levant	5.7447	8.3019	7.3129	10.089	14.245	12.071	11.521	10.833	8.4648

Source: Federico (1997)

3.4.2b Trends of Silk Exports in India vis-à-vis Other Major Exporters (during 1860-1930)

During 1860 to 1930, world silk trade had experienced certain ups and downs. The decadal CAGR (compound annual growth rate) over these period witnessed highest growth in world trade of silk in 1920-1930 and that was mainly because of silk trade boom in Japan (i.e., 10.45%) followed by Italy (i.e., 7.06%). Against this bright scenario of two leading exporters, India's position in silk trade had consistently deteriorated over the period of 70 years (See Table 3.3). During the British rule sericulture did not receive any incentive for expansion which was reflected in the growth statistics in silk-trade. 20th century witnessed a steep decline in growth rate mainly because of the passive role of the colonial ruler in advancement in silk trade.

Table3.1 Decadal Compound Annual Growth Rate in Silk Trade (1860 -1930)

Decade	Italy	Levant	China	Japan	India	Total
1860-70	-0.93	-2.87	-2.48	-1.61	**-1.86**	-1.97
1870-80	2.72	-5.13	5.28	7.84	**-6.53**	-8.57
1880-90	4.88	7.92	-0.12	3.74	**-0.17**	2.13
1890-00	1.45	5.11	1.82	8.18	**1.58**	2.83
1900-10	1.88	2.02	3.73	12.35	**-2.50**	5.38
1910-20	-5.54	-17.4	-3.02	1.59	**-8.64**	-1.83
1920-30	7.06	-2.0	3.96	10.45	**-7.93**	8.12

Source : Calculated on the basis of the data available in Federico (1997)

Fig 3.3 Silk Trade by India during 1860-1930 (in quintals)

Source: Federico (1997)

In 1860 India used to export 6000 quintals of raw-silk, which consistently declined in the following decades and ultimately within the second decades of 20th century India's position in global silk trade had practically vanished (see fig 3.3) . India's share of silk trade in global silk trade had declined from 8.1% in 1860 to 0.1% in 1930, while China's share in global silk trade was 51.5% in 1860, which also declined to 21.2% mainly because of the robust growth in silk trade by Japan. This indicates that amidst stiff competition Japan excelled, but India's relative position worse than that of China. During the 20th century, Japan had revealed a magnificent growth in silk trade withstanding its own silk crisis that occurred during the period of Great Depression, while dominance of China and Italy in silk trade had also contracted during this phase possibly because of the backlash of the Great Depression faced by US economy and its corresponding adverse impact. India's deceleration was marked because of the reason that it had experienced the abrupt down-fall in absolute terms. (See Fig 3.4 and also Table 3.4) Levant (i.e., the eastern Mediterranean regions) had also shown a declining trend in silk trade though the rate of deceleration was slower than India. India's textile policies were by that time were in the hands of the British Monarch whose policy doctrine was more for the interest of England and therefore improvement in artisanal silk industry seemed to be a distant dream during this period under direct British rule. This resulted in a sharp deceleration of the artisanal silk industry during the first half of the 20th century in India.

Fig 3.4- Silk Trade by Major Countries (1860-1930)

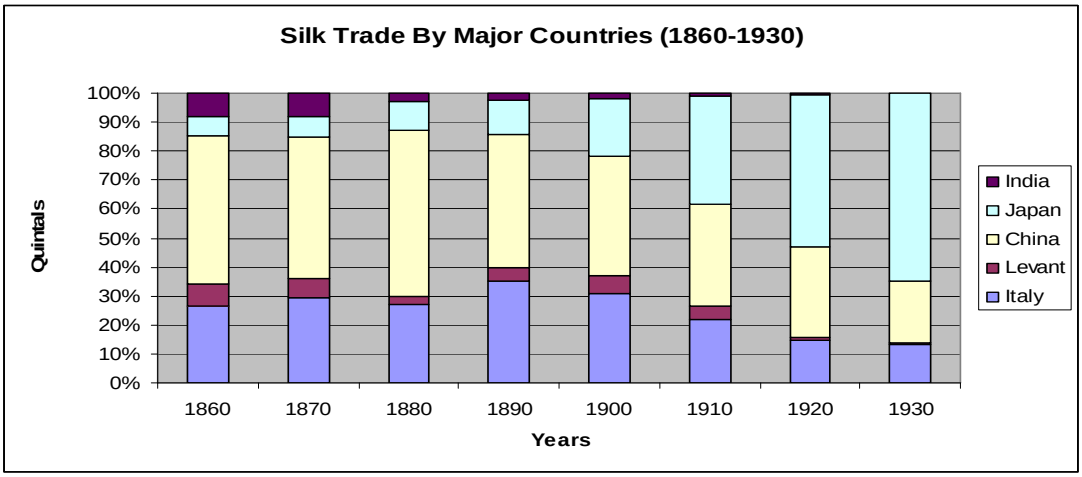


Table 3.2 Global Silk Trade by Major Countries during 1860—1930 (in quintals)

Year	Italy	Levant	China	Japan	India	Total
1860	19616	5510	38142	4850	6000	74118
1870	17857	4117	29666	4120	4970	60730
1880	23371	2431	49645	8770	2529	86746
1890	37658	5210	49040	12660	2486	107054
1900	43500	8579	58727	27790	2908	141504
1910	52396	10479	84760	89080	2257	238972
1920	29608	1541	62359	104350	914	198772
1930	58571	1259	92025	281940	400	434195

Source : Federico (1997)

3.5 Socio-economic Status of Silk Artisans in Colonial India

The colonial period witnessed debacle of several types of artisanal weavers within the textile industry and their reduction into a state of extreme vulnerability. Some of them continued in the industry, but increasingly as wage labourers, or under putting-out contracts. On the other hand, new trades provided other groups of weavers with opportunities for capital accumulation. Long-distance trade in silk-yarn, dyes, raw-silk and jari existed before the railways and steamships, but it turned out to be widely extensive and organized after 1870s. Silk and cotton clothes for domestic consumption was being traded over longer distances after the advent of the railways. These trades saw the entry of new mercantile classes, the participation of artisan groups in the material and cloth trade, and a general decay of systems of spot-sale such as hawking or fairs in favour of permanent markets and contractual sale in textile towns of India. Roy (1993) argued that these jointly contributed to the commercialization in handloom silk as well as cotton weaving sector of the textile industry.

In the interwar period, surveys of the industry, produced in the course of the Tariff Board enquiries (during the period 1926-40 for textiles), or the making of the Fact-Finding Committee report on textiles (1942), created a mixed impression about the growth of the textile sector as a whole. A segment of the industry went into depression, while other parts were doing well. The former offered smaller or more uncertain incomes, the latter higher or stable incomes. The generic coarse cloth belonged to the former economy while the gold-bordered silk sari to the latter. The first half of the 20th century witnessed in several provinces in India that the weaver handling silk or very fine cotton cloth had incomes three to five times greater than that of a weaver making cloths called `coarse' or `ordinary', which included clothes like Dhoti and sari ,i.e., generic men's and women's wear respectively (See table 3.5). The range in the original piece-rate wages in this coarse weaving was somewhat narrower, but silk offered greater continuity of work. Coarse weaving wages varied relatively little between regions, though they seem to have been low on average in the Andhra regions. There are two monthly time rates one from Sholapur town and the other from Madura. Both towns developed, in the interwar period (1919-38), quite extensive wage employment in local textiles. Both wages were higher than the minimum income of non-factory weaver (in coarse cotton) in these regions, but considerably lower than the maximum incomes (in silk). A range of money wage such as Rs. 6 to Rs.15, in which most coarse-weavers would earn in a month in these years, though employment intensity varied considerably between weavers and field

labourers. But a range such as Rs. 40 to Rs. 80, in which the south Indian silk weavers belonged, was decidedly above standards in agriculture. Rs. 40 was an income an experienced carpenter or blacksmith in a northern town might expect to earn per month while Rs. 80 was closer to what a qualified engineer could get in a modern factory. Income inequality among handloom weavers, in other words, corresponded to the difference between an agricultural labourer and a member of the urban middle class. Earnings from silk, fine cotton and exportable goods from the eastern coast could be compared relatively easily over different years in the long span of 1880 to 1940. With adjustments made for price movements, it suggests a consistent rise in trends.

Three specific cases of increase in real earnings are: Santipur (in Bengal) fine cotton weavers between 1890 and 1941; kaily (*or lungi*) weavers of the Andhra coast between 1912 and 1927; and Surat silk weavers between 1900 and 1927. Thus not only the average levels of living were much higher for silk or fine cotton weaving artisans than that of coarse cotton weaving, but also that levels and trends in earnings showed an upward trend (Roy, 1999).

Table 3.3 Approximate Monthly Earnings of Silk & Cotton Textile Artisans during 1925-27

Region	Place	Cloth Type	Earnings per Month
Bengal	Dacca, Rural	16s-20s sari/dhoti	Rs. 11-12/-
	Dacca, Rural	≥ 60s sari/dhoti	Rs. 18-20/-
	Rajbalhat	≥ 60s sari/dhoti	Rs. 40-50/-
Bombay	General	Coarse cotton	Rs.11-15/-
	General	Silk	Rs.23-28/-
	Sholapur, factory wage	8 yarn cotton sari, coarse medium	Rs.15/-
Coastal Andhra Pradesh	Eluru	20s dhoti	Rs. 6-9/-
	Pedana, Palakol	Exportable kaily/ rumal	Rs. 18/-
	Palakol	Fine sari	Rs.21/-
	Ponduru	120s sari	Rs. 33/-
Tamil Nadu	Jayankondam, Thoriyan	Ordinary Cotton	Rs. 11-12/-
	Madura, Coimbatore	Fine Cotton, Silk Turban	Rs. 26-30/-
	Madura, Wage Centre	Silk	Rs. 15-20/-
	Madura, Owner of 5-10 looms	Silk	Rs. 40-80/-
Southern Andhra Pradesh	Bellary-Kurnool wages	Coarse cotton	Rs. 7-15/-
	Bellary, Kurnool, Owner of looms	Coarse-medium cotton	Rs. 40/-
	Bellary	20s-40s sari	Rs. 14/-
	Bellary	Silk bordered sari	Rs. 22-30/-
	Pullampet	Silk	Rs. 12-23/-

Sources : Bengal, Report on the Survey of Cottage Industries in Bengal, 2nd Edition (Calcuta, 1929); S.V. Telang, Report on Handloom Weaving Industry in Bombay Presidency (Bomaby, 1932); N.G. Raga, The Economics of Handlooms (Bombay, 1930); K.S. Venkataraman, 'The handloom industry in South India', Journal of the University of Bombay (1935, 1936) and D. Narayana Rao, Report of the Survey of Cottage

Industries in Madras Presidency, Bellar District (Madras, 1925) as cited in Roy, Tirthankar (1999), Traditional Industry in the Economy of Colonial India, Cambridge University Press.

Alfred Chatterton, Director of Industries in Madras, (as cited by H.Maxwell Lefroy and E.C. Ansorge in *'Report on an Inquiry into Silk Industry in India'*, Vol. II,54, Calcutta, 1917) wrote about the coarse weaver: 'the majority of them have to work harder to make a bare living.' The statement suggests that coarser cotton weaving suffered a decline in real wages, possibly in the last quarter of the nineteenth century. However, information about the earnings of the more skilled and market-oriented silk weavers reveals their comparatively affluent status compared to the coarse weavers.

Roy (1999) derives a stylization from ethnographic data compiled in the castes and tribes anthologies of textile weavers of the major provinces in India. The analysis suggests that the nature of weaving and social status had a close association. Parallel to the hierarchy in earnings, there was a hierarchy of earners. These two hierarchies were correlated. Brief descriptions of four major social orders namely, the services castes, the Muslim weavers of north India, the Hindu cotton weavers, and the Hindu silk weavers - illustrate this point. Rural coarse weaving was performed largely by part-time agricultural labourers. In western and central India, coarse weaving was practiced by groups of people defined and seen as labourers. Such people can be called the `services castes', because their identity as makers and sellers of cloth was dependent on and secondary to their working status. Their occupation was almost entirely confined to the least skilled weaving. The Mahars (Dheds) and Gandas of central India, the Malas of Andhra coast, the Chamars of Punjab and United Provinces, who were primarily tanners, were known to practice weaving along with agricultural labour. Western India also had some settled tribal weavers who were occupationally not very different from the castes as mentioned above. The coarse weaving castes of the Gangetic plains, the Tatwas of Bihar, the Tantis of Orissa, and the Koris and Kolis of United Provinces, were somewhat more of specialist weavers. But they experienced continual infiltration into their rank by the menial castes, weaving being 'the highest occupation ordinarily open to the outcast section of the community'(Ibbestone, 1916). Here, the connection between tanning and weaving was especially close. The Chamars (hereditary tanners) of Punjab were known to weave as freely as the Mahars tanned hides. None was an especially skilled occupation, and all were off-season employment for people whose primary duty was agricultural labour.

In the colonial period, migration, monetization, and reform movements weakened the practice of customary services, whereas markets for cloth (both silk and cotton) were expanding beyond the boundaries of the village. Thus, towards the end of the nineteenth century, the industrial towns employed large numbers of erstwhile 'menials' in diverse 'lowly' services and industrial jobs. In contrast to this the main networks of textile production and trade that emerged in the middle of the 20th century from the mass migration of artisans rarely involved the marginal service castes. The rural coarse weaver did not command great craftsmanship. Nor did they have access to entrepreneurial resources such as business organization or credit. And there were explicit prohibitions as well, for example Mahars were not permitted to dye cloth.

In northern India, there was a large body of Muslim weavers, called Julahas, who were the most abundant of the Muslim castes in northern India. These weavers are believed to be the first Hindu occupational group to convert to Islam. They were spread from Punjab to Bengal, and migrated southward with the spread of Muslim power. In the nineteenth century, many

came to central India, to the Khandesh weaving towns of Malegaon and Ahmadnagar, and to Bhiwandi near Bombay, where they gave leadership to a 'powerloom' revolution from the 1940s. Further south in the Deccan, Muslim weavers became rarer, and, though called Julahas or, more often, 'Deccani Momins', they were mainly converted local Hindus speaking the local tongue. The Julahas were a heterogeneous group. In the village societies, they were lowly placed like all coarse weavers. They tended to be degraded by their peasant customers and occasionally by employers. The name 'Julaha' (in Persian language 'Julah' is known as 'Ball of Thread') became a symbol of rusticity (Chatterjee, 1908). But they were also present in the silk industry of the Awadh and Ahmadnagar. These were the towns where Julahas tended to claim high descent, and formed powerful associations. In eastern parts of the United Provinces, they acquired the notorious fame of being a 'turbulent race'.
Gyanendra Pandey (1991) has reasoned out this image of Julaha for long depression in the craft, and its subjection to Hindu traders. However Roy (1999) argued that Silk in the long run was not a depressed industry and this reputation of the Julahas had a local character. Another probable factor behind the image is that the silk weaver among the Julahas carried a pronounced sense of hierarchy and self-respect, which needed to be aggressively asserted, being opposite to the image of the Julaha based on the figure of the rural semi-skilled weaver. The latter image is reflected in numerous Punjabi Hindu proverbs.

On the other hand, in the South the services castes were rare, and weaving tended to specialize in the hands of four great castes who identified weaving as their traditional occupation, and all of whom enjoyed, by 'cleanliness' standards, a higher social position than the coarse weavers of northern or central India. The predominant Telugu-speaking weaver caste is the Padmasalis, the cotton-weaving branch of the broader category of Sali. They occur mainly in the present territory of Andhra Pradesh, from where a large number migrated into the Deccan towns such as Sholapur, to work in the mills, and supply capital and labour in handloom factories in the early twentieth century. The bilingual Kannada-Tamil Devangas occurred somewhat further south, in southern Andhra, Mysore, and northern Tamil Nadu (Edgar, 1909). Devangas dominated industry and trade in Salem, and in textile towns of the region of Tamil Nadu locally known as Kongunad. Neither caste-group was identifiable with specific products. But their main concentrations, such as Sholapur or Salem, did specialize. Sholapur was known for cotton saris and jacquard sheets, and Salem for fine cotton. Both groups migrated a great deal and such migrations splintered homogeneous communities into classes and subcastes in the towns to which they came (Sastry, 1925). Yet, they maintained a strong sense of identity, at the core of which prevailed the sense of being a skilled artisan. Less visible, but present, were guild-like barriers to entry into the craft that arose from the close association between critical skills and membership of informal collectives. With the passage of time, textile history recognizes these collectives as an important feature of the strategy of migrant weavers to establish themselves economically and redefine themselves socially (Haynes, 1996). Attempts to recreate a community and regenerate roots characterized the Julahas of Bhiwandi, the Padmasalis of Sholapur, and the Sourashtras of Madura, among others. These weavers possessed unique and valuable skills which the rural coarse weaver did not have; they were migrants and needed to stick together; and they faced a contradictory need to collaborate and yet compete between themselves. The social associations enabled collaboration of various kinds, while they also tried, via investment in common good, to preserve fellow feeling despite rising economic inequality. Almost everywhere, silk weavers enjoyed the status of the urban middle-class. As they transacted exclusively with urban elites, whether merchants or consumers, they were often in positions of power, and where power was derived from religion, they claimed Brahmanhood or the warrior (Kshatriya) status (Roy, 1999).

Since 20th century, Indian silk weavers started controlling a part of the trade in cloth and raw material. Contrary to the cotton trade, entry of non-artisanal group was rarer in long-distance silk trade. However, Bengal was the possible exception where the trade prospect was decaying at that period and mainly controlled by urban merchants. In the deep south, the Hindu silk weaver was working gloriously. Some south Indian places became famous for their dyeing and silk weavers owned these dye-houses. The main silk product of the southern town, the bordered sari, was especially skill-intensive and had stable and generating mass demand. The Julaha penetration did not influence much further southward of Bombay city, and, even in Khandesh and Gujarat, the Julahas rarely took up silk, or managed to break into the Hindu monopoly in silk. In Madura, the Sourashtras dominated the silk industries. They began as producers, but controlled trade in the twentieth century. They formed a small and relatively homogeneous group. Occupationally, almost two-thirds of the 'actual workers' in 1921 were engaged in textile trade and production. As with silk weavers elsewhere, Sourashtras carried a strong sense of identity. In their case, this sense was dominated by the memory of a migration from western India through Vijayanagar to Madurai, spanning several centuries and involved with the rise and decline of major regimes of south India. In Madura, they claimed high status, and were partially successful in resisting Brahman opposition to the claim. Consistent with the claim, the Sourashtras also invested a large part of their business profits in basic education. In the 20th century, the community was economically differentiated, the main division being that of between the traders and the weavers. And yet, there was remarkable stability of contractual relations and explicit or implicit cooperation in dealing with common problems (Roy, 1997). Some of these features like, the claim to status, the accent on education, cooperation, and the ownership of both fixed and working capital , can be found in other silk-weaving groups. Thus, Saliyans, a caste settled in Tanjore, made Brahmanic claims as they prospered in textile business. They were probably a breakaway from the Salis, and, showed how a group pursuing a distinct and superior kind of weaving can crystallize into a caste. The Patwegars of the Deccan were 'honest and thrifty people' whose children attended school till they were old enough to weave. The Koshtis of Khandesh, Sholapur, and Poona had customs similar to those of the Salis, but were ranked above them.

The Bombay Gazetteers of the 1880s located the silk weavers of Ahmadnagar Khatris between the Brahman and the main peasant castes in terms of wealth and power. These artisans worked both as weavers and moneylenders and many of them were landholders (Bombay Gazetter, 1884). The Khatris of Hyderabad State were distinctly wealthier than Padmasalis, the cotton weavers (Sahai, 1933). The basic hierarchies influenced how groups of weavers responded to the long reversal in fortunes. Between the 1911 and 1931 censuses, the proportion of Mahars and Gandas engaged in weaving declined sharply in central India. When they left the village, they tended to be employed as factory hands. Groups mainly rural or mainly engaged in cotton weaving tended to leave weaving more frequently. Thus, instances of Kaikkolars giving up weaving were more common than that of the Salis or the Devangas. The average Kaikkolar family abandoned weaving to become `coolies', a term that connoted general labour, including labour in handloom factories. On the other hand, the urban communities and silk weavers responded differently. When the silk weavers had to leave weaving, they tended to shift to skilled professions and trade rather than labour. The silk-weaving Salis of the Andhra coast, for example, dominated the tobacco trade when supply of the fine handspun yarn they used to weave dried up (Thurston, 1909). In general, among silk weavers and the major weaving castes in northern or southern India, the percentages engaged in weaving were usually higher than that in the services castes, and, while the percentages declined more slowly. They diversified, and innovated within weaving.

They migrated from depressed regions and resettled as weavers at points of flourishing silk-handloom trade (Roy, 1999).

In the course of such developments, Sholapur emerged as a major silk and fine-cotton handloom centre led by Padmasali weavers. The number of looms expanded from 2-3,000 in the 1890s to over 20,000 in 1950. Employment in textiles expanded correspondingly (ibid, 1999). A growth of equally impressive order occurred in Madura, led by the Sourashtras, and in Salem, led by Devangas and Kaikkolars. The weavers in these towns became artisanal as well as mercantile. Their engagement in trade was a relatively late affair. Market and technological information were available in these towns relatively easily, because many weavers interacted between themselves. Sometimes, such interactions took place in the associations. The information and the money accumulated in trade were invested in industry. The general direction of change was towards a separation of silk weaving, silk processing and silk dyeing on the one hand, and, on the other hand, towards a sustained improvement in quality and speed of each process. Originally, the three tasks tended to unite either in the family firm, or under various forms of communal pooling of labour. As the male migrant in Sholapur joined the poor weavers, the women and the aged became available to perform sizing and warping in a separate workshop.

The first Sholapur factories were pioneers in the use of the fly-shuttle slay. From the end of the interwar period (1919-1939), and accelerating after independence, there was a noticeable diffusion of looms mounted on frames rather than on pits dug in the ground, and fitted with overhead attachments that made woven designs much easier to implement. An important example of innovation in dyeing comes from Madura. In the middle of the nineteenth century, German and Belgian mineral dyes began to replace the Indian vegetable colours on account of cheapness and facility. But few Indian weavers knew how to handle these materials well. The result was a widespread decline in quality of colour usage. Pre-eminent among the few places which made the transition successfully was Madura. But here, the transition meant a growth of workshops owned and worked by Sourashtras in a quasi-guild situation. Thus the depressed space in handloom weaving consisted mainly of cotton cloth weaving artisans as opposed to silk; in coarser and plainer type of weaving as opposed to skilled decorative weaving.

3.5.1 Influence of Change in Consumption Pattern

Silk had been mainly a commercial and urban item which was frequently traded over long distances in the pre-colonial period. A form of patronage existed and silk weavers were often settled directly by those in power. But, unlike carpets, silk was not consumed mainly inside palaces. It was not a luxury in that narrow a sense, but a durable good consumed by ‘the higher classes’ (Watt and Brown, 1904). This demand, arising from `the rajahs, courtiers and zamindars', declined from the middle of the 19th century. An external trade in Bengal, nurtured by the East India Company, was also on the wane from somewhat earlier. The rich higher classes who could afford to compensate for these losses, tended to have quite different tastes. But there was still a large ritual usage of pure silk garments. The demand for cloths for ordinary use which utilized silk, such as silk-bordered fine cotton saris, or silk-weft cloth like *himroo* or *mushroo*, was also quite stable, and probably even expanded. Nevertheless, tastes were changing. The Fact-Finding Committee (1942) reported that, for certain occasions, a change of fashion had been taking place from heavy silk garments towards shorter, lighter, more cotton-based ones in most parts of India. Such a trend might mean a smaller demand for pure silk, but a greater demand for silk-bordered cloths. Pure silk weavers often did take

up silk-bordered cloths. This shift towards lighter designs coincided with a weakness for European patterns. Around 1900, all established silk towns followed sample books of English wallpaper designs, setting aside the dusty old mica sheets that contained etchings of the uniquely Indian ones. The illustrated trade catalogue from Europe invariably overran the practice of skilled crafts in India. This degeneration or slow-death of traditional/indigenous design was apparent in all classes of designed goods and mostly in silk textiles (Watt and Brown, 1904).

3.5.2 Expansion of Silk-Weaving across India in Colonial Period

Silk weaving was widely spread in southern India in the middle of the 19th century, owing to the existence of sericulture in the Kollegal area of Mysore. The raw silk trade was located in Mysore, Bangalore, and Kollegal towns, fanning out to several distinct weaving complexes. The most important were Bellary-Kurnool (which had a local demand, as well as a fair amount of trade with Hyderabad, Bombay-Deccan, Mysore, and the deep south), Anantapur (Dharmavaram town, whose cloth were traded mainly in Bangalore), North Arcot (Gudiyatam town, trading within the south), and a cluster of towns in the Tamil country (Tanjore, Madura, Kumbakonam, and Kanchipuram), where silk existed for a long time primarily for local usage, and vastly expanded in the early twentieth century. The proximity to another source of raw silk, Bengal, also supported a minor tradition in coastal Andhra (Godavari and Krishna districts, where demand was mainly local). In Madras Presidency, the main decline seems to have occurred in the southern Andhra region. This region was devastated by the 1876-78 and 1896-98 famines. Possibly due to its proximity to Vijayanagar and to patronage from smaller local principalities in the pre-colonial period, several towns of this region had developed into centres of silk weaving in the early 1800s. However, after the railways connected it to Bombay-Deccan in the northwest, and the Tamil region in the south, it began to regress steadily towards obscurity in the twentieth century. The censuses of 1901-31 are witness to the role this large region, along with parts of Hyderabad State, played as a source of migrant labourers for plantations and industry elsewhere in India, and even beyond. Many migrants were former weavers. Ranga (1930) recorded the unsettled conditions. From his account, it would appear that, from about the 1890s, the region was gradually moving away from silk that competed with products of mills as well as handlooms elsewhere in southern India. Silk cloth came from two sides, the Tamil country in, the south, and Bombay-Deccan, chiefly from Poona. In Bellary district, formerly the cloths of Kampli, Bellary, and Adoni were extensively used. But the local better classes preferred the southern product once they began to come in more easily after the railways.

Edgar Thurston (1899) reported ‘the weavers have been trying to weave cloths like those manufactured in the south’, with partial success. Similar examples come from coastal Andhra, and from Kurnool district, where Ayyampet, one of the famous silk carpet locations in India is situated and declined in the latter part of the 19th century. In the cluster of towns in the Tamil country it grew - evidently in Kanchipuram and Madura, and in Tanjore and Kumbakonam as well. On a smaller scale, Arni and Kollegal also got attracted to this new business. In Madura, for example, many Madras weavers formerly engaged in fine cotton shifted to silk. Much of the products made in the south were pure silk saris with borders of *jari*, the type known as `Kornad', a garment whose demand has proven remarkably stable in the long run. Within southern Andhra, survival was restricted to the small artisanal trading town, Dharmavaram. There were also a few successful silk factories, in coastal and southern Andhra, started by cloth merchants shortly before the First World War. Ventures in Uppada, Peddapuram, and in Rayadurg in Bellary are the main examples. Somewhat similar in nature,

but less documented, is the effect of Bombay and Madras products on the weavers of Hyderabad State. The state had apparently become a net importer of cotton and silk cloth in the interwar period (1919-1938). Local silk weaving had to live with competition from the far south, which became more intense over time. The reason for the popularity of imports was their better quality and standardization. The competition was fierce and caused much alarm among the officers of the state dealing with silk-industry. And yet, the impact was not entirely destructive on silk. The silk weavers of Hyderabad had both specific markets and specific skills. Examples of the former are the mixed cotton-silk cloths popular with the Muslims (*himroo* and *mushroo*) and brocades, both woven in Aurangabad. Examples of the latter are saris woven in Paithan town, and reasonably good quality *pitambar*, a Hindu dining and ritual robe. On the other hand, the Hyderabadi weaver seemingly expanded long-distance trade, and the scale of production. One sign of such changes was the factory owned by rich silk weavers who traded, and at the same time sub-contracted part of their orders. By 1942, 40 per cent of the 100,000 weavers in the state were employed in such establishments. Western India witnessed another local contest. In the middle of the nineteenth century, silk weaving here was in existence not only in the former capital Poona, and in major trading and manufacturing towns like Surat, Yeola, and Ahmedabad, but in fact in `most of the places in this Presidency.

Contrast to the above, the expansion of Bengal silk industry was considerably smaller, less skilled, and more rural than major silk-weaving complexes in other regions. It was not surprising that the rise of Benares adversely affected the prospects of Bengal products. In Bengal, ‘a Hindu lady who can afford to wear a Benares sari will not look at even a high-class Baluchar’ from Murshidabad (Mukherji, 1903). There was decline in smaller centres such as in Hooghly, Burdwan, Birbhum, and Bankura districts. The weaving industry came to be concentrated in Murshidabad district (Baluchar, Mirzapur, Khagra, and Islampur villages), owing to local sericulture. But, even here, the scale of trade was small, not only compared to Surat or Benares. The next section will vividly focus on the issues concerning rise and growth of artisanal silk industry in Bengal. Before venturing into the above, it is more important to reason out the issues of constrained factors regarding the smaller centre. Roy (1999) argues that three adverse factors were at work.

(i) Long-distance trade in silk created barriers to entry to the silk-trade. The need for capital, especially working capital, was greater than before. Risks increased, because of proliferation of principals and agents, and because the traded goods in silk were expensive. Silk, for all these reasons, required capital and information. These were easier to obtain in large assemblage.

(ii) As in the case of several decorated crafts, quality was a factor in the competitive success of brands of silk. In silks, quality mattered crucially in respect of dyeing, and, to cite K. S. Venkatraman (1935) in reference to Madura, `dyeing requires more skill than weaving'. Bigger towns had better infrastructure and common facilities such as dye-houses.

(iii) The consumer faced a choice between numerous local decorative styles, all traditional and closely similar to each other, and a new type of decorative capability which could, simultaneously, simplify old designs, standardize them into fewer ones, and create new designs. That there was indeed such a choice, and that preferences shifted from the former to the latter, was noted by the Fact-Finding Committee (1942).

Integrated trade initially caused the disappearance of many locational names for sari borders in southern India. The few which remained, later began to innovate and branched out on the foundation of a core decorative style with which the town was identified. As these towns grew in scale and reputation, trade information began. S. V. Telang (1932) estimated the average daily trade in silk cloth in Yeola at Rs. 10,000, and in Surat at Rs. 15,000, in 1932. Again, in 1941, when prices were much higher, Murshidabad district's trade was placed at Rs. 2.2 million a year or Rs. 6,000 per day, including both cotton and silk.

3.6 History & Growth of Artisanal Silk in Bengal in Pre-Independent Period

The practice of sericulture and manufacturing of silk in Bengal had perhaps begun in the 15th century, though no specific evidence has been found till date (Guha, 2003). Walsh (1902) narrated it by stating 'it is impossible to discover the date at which the silk industry commenced in Bengal, but it must be of great age.' But the silk industry was one of the earliest of all industries which preoccupied the servants of the East India Company in Bengal. The trade status of Bengal silk bears a glorious heritage, as it has been noted by many famous travelers and historians during the period of Great Moghuls. Bengal silk fabric allured British traders to initiate silk-trade. In 1612, Sir Thomas Roe in his embassy to 'Durbar' of Jahangir offered silk clothes of Malda and Murshidabad in order to receive trade approval in Bengal silk. However, his mission remained partially successful, as Jahangir had granted them the right to establish farms in the port of Surat but not in Bengal Presidency. Richard Hughes, the Chief of Patna Factory, reported in 1620 about the potentials of Bengal silk farms. He informed the Surat Council that the Bengal silk could be easily procured in abundance in Patna at a price 35% cheaper than that of Agra. He further pointed out that at Murshidabad an infinite quantity of 'choicest staff' could be had, at least 20% cheaper than in any other place of India. Though Bengal Silk was evidenced to be known as "Ganges Silk" in distant Italy as early as the 13th century, the East India Company started extensive silk trade in 1651 after receiving *Farman* from Prince Shah Suja.

The rural households of the then Bengal was mostly engaged in three stages of production: mulberry cultivation, silkworm rearing and reeling of yarn. They used to sell the raw silk to specialize weavers in nearby villages or towns and the trade volume was quite remarkable. The *Pundra* caste was the hereditary silkworm rearing caste and they practiced sericulture in Malda and parts of Borga, Rajshahi and Murshidabad (Guha, 2003). Pundra region in Bengal had started receiving importance almost equivalent to Benaras silk which possessed age-old reputation. As a matter of fact, the productive potentials of Bengal had attracted the European traders and from the modest beginnings in small trading posts, these English and Dutch Trading Companies came to dominate the trade. They gradually influenced the types of textiles produced and also organized a shift from textiles exports to the exports of raw silk, which was actually the requirement of far flung markets.

During the first wave of globalization, the progress of sericulture in Bengal was mainly trade driven which was clearly evident in the process of marketing organisation and production structure. The opening up of the Hugli Factory in 1651, the Kassimbazar Factory in 1658 and the Malda Factory in 1680 by the East India Company substantially helped them in conducting an extensive trade in Bengal (Chaudhury, 1975). In order to ensure steady supply of raw materials, the company made some strenuous efforts to increase the production of silk. The company expanded mulberry cultivation areas and silk factories and filatures. In a number of specialized villages scattered throughout the north western part of Bengal, peasants cultivated mulberry on their small plots of land, reared silk worms and reeled raw

silk within their households. In Kasimbazar, the principal market of raw silk, the *dadani merchant*[5] received the advances from Asian and European export merchants and distributed them to village producers. At harvest time, they collected raw silk from the peasants and brought it to the manufactories, where the export merchants could get the raw silk rewound and sorted by the native artisans before sending it to their home markets. Gujarati, Multani, Patna, Armenians and Europeans were the principal exporters while the Bengali dadani merchants specialized in the intermediation between the exporters and producers (Mukherjee, 2006).

Throughout the 17th century Bengal silk was the cheapest of all other silks including Persian and Chinese silk. In 1683, the Dutch company made a profit of about 200% in Bengal silk mainly due to its abysmally low price. The English company too made a profit of 250% in the sale of Bengal-silk brought by Maratha in 1695-96 (Chaudhury, 1975). Allured by this pay-off, the East India Company prohibited its servants in 1671 to deal in Chinese silk so that Company's monopoly in Bengal silk could be inflated. From the last quarter of the 17th century the Court of Directors urged to invest more and more in Bengal silk. "In 1675 they asked the Hugly Agency to take up twenty thousand pounds by exchange and invest in raw silk and repeated their instruction in their letter in 1676 (ibid, 1975). The court wrote in 1677 that the Malda goods had a great demand in the market. Thus a supply emphasis was laid by the Company on the trade of raw silk from Bengal.

In this way the foreign merchant driven growth of sericulture and silk industry kept on expanding till 1740 as it had attracted European companies for securing raw-silk and fabrics from Bengal, particularly of Malda and Murshidabad. From 1701 to 1740 raw silk import from Bengal was higher than that of China (see table 1). During 1740-50, no raw silk was imported from China to England.

Table 3.4 Raw Silk Import from Bengal & China by EEIC during 1701-1740

Years	Raw Silk Import from Bengal (in lbs.)	Raw Silk Import from China (in lbs.)
1701-1710	514364	317539
1711-1720	578004	55180
1721-1730	1046861	85303
1731-1740	1416911	77063
1741-1750	896052	NA
1751-1760	428072	12995338

Source: K.N. Chaudhury, Trading World of Asia and the English East India Company (1660-1760), Cambridge, 1978, pp 533-535.

During 1742-1751, the consecutive invasion of Maratha intruders destroyed the silk production and economic life of the artisans[6]. The Court of Directors finally took interest in this regard and suggested EEIC to plant mulberries and establish cocoon rearing farms as well as reeling and weaving units in safer place (another side of the river Padma[7]). The Maratha invasion resulted into a considerable decline in the growth rate of imports that had been observed during the decade of 1740-1750. Again Anglo-French conflict and the wars

with Nawabs of Bengal upset this splendid trade. During 1751-1760, East India Company's imports from China rose three times than that from Bengal. Bengal witnessed a serious recession in this phase. During the early phases of 18th century Bengal silk was so popular to British customers that a separate law was enacted to protect and encourage the woolen industry. However, that law could not affect the sericulture dependent economy of Bengal very seriously. As there was an increasing demand of raw silk in United Kingdom, sericulture received much more attention from the East India Company than the weaving of silk fabrics (Ghosal, 1966).

The Company got the 'Dewani of Bengal' in 1765. After the acquisition of Dewani, the Company took serious interest in raw silk business. The silk manufacturers were forced to work as silk winders to the Company's factories and they could not work elsewhere (Dutt, 1956). The ryots[8] were encouraged to undertake mulberry cultivation and the waste lands were given to them rent-free for two years.

3.6.1 Impact of Piedmontese (Filature) Technology on Bengal Silk

The major quality inadequacy with Bengal raw silk was its inequality in the same skin. The mode of assortment was also neglected. The Bengal artisans could not cross the filaments of cocoons when they reeled the silk, which resulted in lack of roundness and lightness indispensable to produce good thrown silk (Carlo Poni, 1981). The Court of Directors informed the Bengal Government that unless the defect got rectified the EEIC must throw out its exportation to England (Report on Silk, 1836). It was under these circumstances that the company decided to introduce the Italian method of reeling and spinning in Bengal, which came to be known as Piedemontese technology or Filatures. In 1769, the Company contacted with three managers – an Italian, a Frenchman and an Englishman to teach the native artisans about use of Piedemontese reeling machine and the management of filature.

The first filature in Bengal was built in 1770 and the first consignment of silk-filature that reached England was in 1772. It took about fifty long years for the Company to convert whole of its investment in silk into filature assortment. Introduction and consequent extension of this filature reeling method brought a revolution in Bengal cottage production as well as marketing organization of Bengal raw silk. EEIC had to struggle hard to make filatures acceptable in India. Although the entire project was beneficial for the rank and file, nevertheless it took much time to gain popularity due to traditional customs preferring orthodox artisans of Bengal. According to some historians, the conflict between original Bengal cottage system and the new Piedemontese filature system had caused friction and tension because of widely differing interests of several sections of people (Mukhopadhyay, 1995). Under the traditional Bengal cottage organization, the peasants had complete autonomy over the quality they wanted to achieve. They decided whether to obtain a fast reeled coarse silk or a finer quality manufactured through slower and more accurate reeling. These decisions were simultaneously influenced by quality of cocoons and market trends. They knew that demand from different communities of raw silk exporters varied with place where subsequently the silk were woven.

From 1790s onwards the peasants were forced to sell the cocoons to the company's agents at a very low rate. This force of commercialization had reduced the production cost of raw silk on one hand and also compelled the peasants to depend upon its agents by means of a debt bond created by the advance. Thus the peasants had no other market relation other than with the Company.

During the early colonial period, the Bengal mulberry cultivators demonstrated their capacity for improving their economic situation through entering silk sector when prices of other crops were low and abandoning silk sector as soon as the opportunity cost started rising. It was evidenced in 1780s, as the peasants who had entered into silk sector in the previous decade autonomously decided to stop their involvement with silk in the successive decades. Thus the social and demographic pressure drove the peasantry to turn the cultivation of high value and labour intensive crops to supplement a diminishing income from smaller plots of lands (Bose 1993).

The war between France and America[9] also left some impact on silk production inside India as the company took the decision to stop its investment in silk. At the same time there was rice shortage in Northern India leading to a rise in price of Bengal rice. This resulted in most of the mulberry cultivators converting their lands to cultivation of rice.

The Court of Directors in a painful letter wrote to the Bengal Government about the depressing situation of silk market in Europe. The Director decided to reduce the quantity of raw silk import due to fall in demand of silk throughout Europe. The company had a loss of more than 4% on raw silk and many of silk goods remained unsold. However, the silk manufacturers of England in their memorial to the court pointed out that the ready availability of Bengal raw silk would be beneficial to national interests if surplus raw silk could be successfully brought to use at the silk factories of England (Millburn, 1813). Ultimately, the Court of Director accepted the proposals and accordingly instructed the Bengal authority to increase their supply of raw-silk. During the year 1803, the supply of Bengal raw silk rose to nearly 150 bales a year. From 1803, the export of Bengal silk to England rose steadily, but the silk supplied by he private traders was not of good quality.

The rigorous enforcement of the Continental System (1806-1807) by Napoleon and the entire cessation of the customary importation of Italian raw silk into Great Britain helped to revive Bengal silk trade to some extent during the first decade of nineteenth century. The Bengal Government was asked to increase the annual export of Bengal raw silk by 4000 bales. The development in silk investment during this time was remarkable. Buchanan (1928) mentioned that in Purnea district about 47,000 persons got advances from factories of Malda, Murshidabad and Jungipur for the supply of cocoons and Purnea supplied around 44,000 maunds of cocoons to these factories every year during this time. In those days, important silk production centers were Kasimbazar, Jungipur, Malda, Kumarkhali, Rampur, Boalia, Rangpur, Radhanagr and Gonutea.

Finally, the Charter Act of 1833 compelled the East India Company to wind up its silk trade in Bengal and they had to withdraw in 1835. Presumably, this had a serious adverse effect on the silk industry of Bengal. However, the silk business lingered in the hands of the private traders. Cocoon exports were initiated from Bengal during 1870-71 and import of Bengal silk was considerably reduced. The once flourishing silk industry of Malda and Murshidabad, which was the glory of India became the worst victim of the British Colonial and industrial policy and thus caused economic distress among the people of the country. The market forces once encouraged the growth of silk industry during the pre-colonial period and early colonial phases and Bengal had gained economic stability through this industry (Anstey Vera, 1952). But, in the phase of full colonialism, India, which was the hub of a large part of the world's commerce, lost her position and the mulberry planters, the cocoon rearers, the silk reelers, the

weavers, the indigenous merchant men, all who were connected with this industry lost their financial base due to the economic dislocation caused by the colonial policy of the company. In the early 20th Century, Bengal silk was pushed out from South Asian market especially by its domestic rivals Kashmir and Mysore silk. By the 1930s, Chinese and Japanese silk started replacing Bengal silk even in its domestic space. In terms of employment this resulted in loss of economic opportunities to hundreds of silk artisans in Bengal. The area under cultivation of mulberry in Bengal fell from 54000 hectares in 1896 to 7000 ha in 1914 and 4000 ha in 1937. After partition in 1947, most silk producing areas of Bengal became part of West Bengal in India. Less than 10 percent of Bengal mulberry area was in Rajsahi, i.e., East Pakistan (presently In Bangladesh). At the time of independence, there was 4047 hectares of mulberry plantation area in West Bengal and annual production of raw silk was only 215MT.

3.7 Conclusion

We have analysed in the previous sections how from mid of the 17th century (1635-50) silk trade in India started flourishing when the demand for cheaper Bengal Silk began to rise in European market. Initially Dutch merchants were collecting the silk from domestic market for exporting it to European market and afterwards English East India Company (EEIC) took over the control of this silk trade spreading their tentacles in different parts of inside and outside of Bengal Presidency. However, the British traders understood that only low-priced silk could not retain their market status; so they had introduced Italian technology (known as Piedemontese Technology) of reeling in Bengal Sericulture in 1769. Bengal sericulture was never an ideal place for the implementation of Piedemontese technology and moreover Bengal economy at that period was going through several natural calamities and domestic disturbance as we have already discussed in this chapter. Even in the first half of the 19th century silk trade was prospering with a commanding pace. From 1813, after the loosing of EEIC's monopoly over trade, the company started selling its filatures. But the trade was still growing as the filatures were purchased by other British and Indian traders. The economic power of *dadani* merchant, money-lenders started growing from this period and they formed a new middle class while the situation of artisan and farmer class were worsening day by day. The socio-economic condition of artisanal classes in Bengal was wretched compared to their counter parts in other portions of the country, though silk weavers were universally earning higher income than the coarse cotton weavers in the colonial era. The condition of native artisans of Bengal further deteriorates under the rule of British Monarch. The orientation of the monarchy was never in favour of promoting this artisanal industry which caused further fall of the industry. Bengal silk was worst hit than Kashmir and Mysore silk, which had gone through a process of revamping under Maharaja Ranbir Singh and Tipu Sultan. In the later years Karnataka became the largest silk manufacturing state in Independent India. The next chapter would at length discuss the growth of the artisanal silk sector during periods of economic planning in Independent India and how several states contributed to that growth trajectory.

End Notes

1. This spinning technique is exactly similar which has been promoted by Mahatma Gandhi much later.
2. Francois Bernier was French Physical of Mogul Emperor Aurangzeb, who visited Kashmir and Bengal and wrote 'Travels in the Mogul Empire' where indication of silk, muslin, fine brocade was quite prominent.
3. Piedmontese technology was the improvised Italian silk-reeling technology which was introduced in Bengal by British East India Company in 1769.

4. Bengal Presidency was established in 1690 which comprised the areas now within Bangladesh and the present West Bengal, Assam, Bihar, Meghalaya, Tripura, and Orissa. It also includes all the British Possessions of the Central Provinces (Madhya Pradesh) from the mouths of the Ganges and Brahmaputra to Himalayas as well the Punjab.

5. Dadani merchant is a local community specialized in the intermediation between the producers and exporters of raw silk and silk textiles.
6. See Edward C Dimock & Pratul Chandra Gupta's 'The Maharashtra Purana. An Eighteen Century Bengali Historical Text', Honolulu: East-West Centre Press, 1965.
7. The Podda (or Padma) is the main distributary river of the Ganges and also the transboundary river between two Bengals, West Bengal and Bangladesh.
8. A ryot was defined as someone who has acquired a right to hold land for the purpose of cultivating it, whether alone or by members of his family, hired servants, or partners. It also referred to succession rights.
8. This war was, alternatively known as Quasi War, which was an undeclared war fought between US and France during 1798-1800 on the ground of some economic issues.

CHAPTER: 4

Indian Silk Industry after Independence

(1947-1990)

4.1 Introduction

In the foregoing chapter, we extensively discussed about the historical genesis of the artisanal silk industry in India as well as in Bengal (Presidency) starting from the ancient period of time to British era via English East India Company's incentive approach to exploit the sericulture potentials of the artisans of India. The present chapter will illuminate the growth pattern of the artisanal silk sector in post independence period till the emergence of liberalisation in India in 1990. The problems which restrained the scope of the industry to reach its goal of success will also be emphasized in the course of discussion.

In the pre- independent period, the first authentic enquiry about the status of Indian silk industry was undertaken in 1914-15 by H. Maxwell Lefroy and E. C. Ansorge. They suggested the formation of a central organization to address the needs of the industry. Subsequent information by a Silk Panel in 1946 led to the formation of the Central Silk Board in post independence period, i.e., in 1949. Central Silk Board was established in Karnataka as a statutory body under the administrative control of Government of India. Inspection of quality of exportable silk goods had become the chief objective of this body. In order to promote exports of natural silk goods Indian Silk Export Promotion Council was established at Mumbai in 1983. Despite several endeavours, India's position in global silk trade is still not up to the mark in the post–independence period, in spite of India being second position in raw-silk production in the world. This ambiguous situation between production and exports indicates two possible outcomes- (i) India is a large consumer of silk goods and thereby Indian silk-traders are catering to the domestic market needs instead of concentrating on foreign market. (ii) Indian silk (raw silk and silk goods) may not be suitable enough to have wide access in the foreign market due to comparative price and quality disadvantage.

In India, sericulture is not only a traditional means of livelihood but also a living culture. It is a farm based, labour intensive and commercially attractive economic activity falling under the cottage and small scale sector. Sericulture is increasingly becoming popular through out the country due to its short gestation period and quick recycling of resources (Anantha Raman et al., 2007). It particularly suits rural based farmers, entrepreneurs and artisans as it requires small investment but with potential for relatively higher returns. It provides income and employment to the rural people especially farmers with small land holdings and the marginalized and weaker section of the society. It plays a significant role in ensuring inclusive growth giving women and people from backward sections enough scope to earn their livelihood. The forthcoming chapters will make an intensive research study on these issues of the artisanal sector, especially focusing on the state of West Bengal. But before that, it will be pertinent to elucidate the growth trajectory of this sector in post independence period.

Section 4.2 will elaborately study the realization of growth potential of the silk manufacturing sector by traditional and non-traditional states of the country during pre-liberalization period in India; Section 4.3 will surface the lacunae of sericulture sector in India and will also throw some light on the problems faced by the farmer-artisans involved in this vocation; Section 4.4 will deliver the performance analysis of artisanal silk sector in the traditional and non traditional states while section 4.5 will conclude the chapter providing a way ahead prior to the emergence of liberalization in India

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4.2 Performance of Artisanal Silk Industry during Pre-Liberalization Periods (1950-1990)

India is home to a vast array of silk secreting fauna, which includes an extensive diversity of silk moths. This includes all the four commercially traded variety, namely mulberry, *tasar*, *eri* and *muga*. Amongst these, only mulberry silk is domesticated and the rest are wild silks. In mulberry again mainly multivoltine silk is cultivated as it suits the agro-climatic condition of this tropical country, while bivoltine is also produced but in much less quantities. Mulberry sericulture is well suited for marginal, small and landless farmers. It always derives an edge over the other agricultural crops due to its undersized investment requirement, short gestation period, employment generating capacities and gender promoting potentials in both on-farm and off-farm activities. It has been estimated that one hectare of irrigated mulberry sericulture would generate employment of about 13-16 persons round the year while the activity domain includes mulberry cultivation, silkworm rearing, reeling, twisting and spinning, dying, bleaching and weaving and finally trading (Vijaykumar et al., 2007). In every segment of this vertically integrated sector certain value is being added. For India, it has been estimated that farmer and silkworm rears add value of 48.34 percent while 21.64 percent value is flown back to traders and rest of the value additions are shared by weavers (11.18 per cent), reelers (9.58 per cent), twisters (8.12 per cent) and dyers (1.14per cent) respectively (Lakshmanan and Geetha Devi, 2000).

With the advent of economic planning in the economy the artisanal silk sector of India set out on its progressive course of development. Indian government along with state governments and Central Silk Board started launching various projects in different states for the development of both mulberry and wild silk. Though sericulture did not find its place during the First Plan (1951-52 to 1955-56), it was included under the broad head of "Other Village Industries". Central assistance to the tune of Rs. 60.30 lakh was allocated to states as grants and loans through the Central Silk Board (CSB) and the utilization of fund during this plan was only Rs. 33.60 lakh, while Rs. 21.70 lakh was utilized by the states and the rest by the central sector.

A separate allocation both for the central and state sectors was approved by the Planning Commission for sericulture development from Second Plan (1956-57 to 1960-61) onwards. Since then, several development projects under the Central sector were taken up along with the state programmes. Against an allocation of Rs 379.25 lakh for the implementation of 339 state related artisanal silk promoting schemes, only 60%, i.e., Rs. 224.49 lakh were utilized. In the central sector, the expenditure (Rs. 26.13 lakh) was less than its allocation (Rs. 35.17 lakh). Production of raw silk during this plan period was stimulated to 15.13 lakh kgs from 14.86 lakh kgs. Emphasis during the Second Five Year Plan was laid on the development of the seed organization and improvement in silk reeling. Among major achievements, mention-worthy are passing of legislation in Karnataka state to prevent the use of unexamined seed for commercial production and large scale introduction of improved cottage basins for promoting quality and quantity of raw silk, establishment of the Central Silkworm Seed Station at Pampore (in Jammu & Kashmir) and setting up of the All India Sericulture Training Institute[1] at Mysore by the Board.

During the Third Five Year Plan (1961-62 to 1965-66), Rs. 702 lakh was approved for the development of this artisanal industry of which Rs. 552 lakh belonged to State schemes and the remaining was allocated for central schemes to be implemented by Central Silk Board. The total expenditure incurred by the states was Rs. 3339.42 lakh amounting to 61.48% of the

allocation while less than 50% was utilized in the Central schemes. During this plan period the production of raw silk rose from 15.13 lakh kgs to 20.65 lakh kgs. In the Third Plan, the seed organization was further consolidated in the states of Jammu & Kashmir and Karnataka. Organization of research received adequate attention in this period. The Board established the Central Sericultural Research & Training Institute at Mysore in 1961 and the Central Tasar Research Station at Ranchi in 1964. It also reorganized the Central Sericulture Research Institute at Berhampore (West Bengal). Modernization of reeling with a view to improve the quality of silk made commendable progress during this plan period. A spun Silk Mill was also set up in Assam for utilizing muga and eri silk cocoons and silk wastes produced in this region of North East India.

Table 4.1 Financial Allocation & Expenditure of Indian Artisanal Silk Industry during the Five Year Plans (1950-1990) (Rs. in Lakh)

Plan Periods	Central Sector		State Sector		Total	
	Allocation	Expenditure	Allocation	Expenditure	Allocation	Expenditure
I Plan (1951-56)	14.30	11.90	46.00	21.70	60.30	33.60
II Plan (1956-61)	35.17	26.13	379.25	224.49	414.42	250.62
III Plan (1961-66)	150.00	72.32	552.00	339.42	702.00	411.74
Transitional Period (1966-69)	70.23	62.75	482.28	218.98	552.51	281.73
IV Plan (1969-74)	130.00	81.61	839.00	593.38	969.00	674.99
V Plan (1974-78)	861.20	586.17	1693.18	1109.06	2554.38	1695.23
Transitional Period (1978-80)	1320.00	1105.46	1589.71	1259.26	2909.71	2364.72
VI Plan (1980-85)	3100.00	3715.00	13637.00	8923.00	16737.00	12638.00
VII Plan (1985-90)	7000.00	8816.00*	24078.00	20680.00	31078.00	29496.00

* It includes an expenditure of Rs. 240 Lakh on NSP initiated during the year 1989-90.
Source : CSB (1999) [Compendium of Statistics of Silk Industry. CSB Ministry of Textile. Govt of India]

During the transitional period under the rolling plan 1966-67 to 1968-69, there was allocation of Rs. 482.28 lakh for the states and utilization was Rs. 218.98 lakh only. Compared to utilization of state funds, central allocated funds were utilized to a greater extent i.e., out of Rs.70.23lakh allocation, Rs.62.75lakh was utilized. At the end of the transitional period, the raw silk production was 23.20l akh kgs. Among the important schemes initiated during this period, mention may be made of the initiation of price support scheme for tasar cocoons in December 1966 by the Board to arrest the steep fall in prices sustained by the industry to ensure a fair return to primary tribal rearers.

The expansive objective envisaged in the Fourth Plan was attainment of self sufficiency with regard to the country's demand for raw silk through increased productivity, reduced cost of production through rationalization of production technique and creating additional

employment opportunities to about 4 lakh persons. The allocations of state and central projects were Rs. 839 lakh and Rs.120 lakh respectively, the corresponding utilization being Rs. 593.98 lakh and Rs. 81.61 lakh. Under the central sector, research and seed organization were further strengthened while Regional Research Stations were set up at Majra (Uttar Pradesh) for mulberry and at Batote (Jammu & Kashmir), Bheemtal (Uttar Pradesh) and Imphal (Manipur) for oak *tasar*. The *eri* and *muga* research unit at Titabar (Assam) was taken over by the board and action was taken to reorganize the same into full fledged research station. Important achievements during the plan period were introduction of oak *tasar* in sub-Himalayan regions of the states of Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh and Manipur on one hand and introduction of bivoltine rearing in the traditional multivoltine areas of Karnataka, Tamil Nadu and West Bengal along with consequential break through achieved in silkworm rearing technology by the research institutes of the Central Silk Board. In 1972-73, the Central Silk Board set up a raw material bank at Chaibasa in Bihar in order to support the tribal artisans practicing sericulture in that region through stabilizing *tasar* cocoon market conditions. Raw silk production at the end of the plan rose to 28.94 lakh kg.

During the Fifth Plan (1974-75 to 1977-78), the Planning Commission approved a total outlay of Rs. 2554 lakh for planting mulberries in state (Rs. 1693 lakh) and central (Rs. 861 lakh) schemes. Out of this, Rs. 1109.69 lakh were spent on state schemes and Rs.586.17 lakh on central schemes. In 1975-76, a special scheme of supplying mulberry cutting at subsidised rate under the central projects was launched to promote mulberry sericulture especially in backward areas. During this plan period, the program for introduction of bivoltine silk production in the traditional multivoltine states at Karnataka, Tamil Nadu, Andhra Pradesh was further reinforced by establishing 11 grainages to supply quality bivoltine and cross breed silk worm seeds. The Central Silk Board launched a scientific program of *tasar* silkworm seed production which included setting up of Basic Seed Multiplication and Training Centres (BSM&TCs) under the direct control of the Central Tasar Research and Training Institute, farming for production of qualitative and disease-free seeds. In addition to that, eight pilot projects under the state sector was launched for multiplication of basic seed supplied by BSM&TC. The capacity of each BSM&TC was fixed at 60,000 dfls, to be supplied to 8 PPCs in the states. One more spun silk mill was set up at Bhagalpur under state sector. These resulted in the increase in the level of raw silk production to the level of 37.11lakh kgs while export earnings touched Rs. 33.06 crores.

Table 4.2 Physical Growth of Silk Sector in India during the Plan Period (1950-1990)

(Unit in tones)

Plan Periods	Mulberry Silk	Wild Silk			Total
		Tasar	Eri	Muga	
I Plan (1951-56)	1098	141	127	71	1437
II Plan (1956-61)	1185	179	110	39	1513
III Plan (1961-66)	1545	262	201	57	2065
Transitional Period (1966-69)	1781	256	214	69	2320
IV Plan (1969-74)	2421	257	141	75	2894

V Plan (1974-78)	3186	434	56	35	3711
Transitional Period (1978-80)	4193	384	183	45	4805
VI Plan (1980-85)	6895	444	279	55	7673
VII Plan (1985-90)	10805	329	704	72	11763

Source : CSB (1999) [Compendium of Statistics of Silk Industry. CSB Ministry of Textile. Govt of India]

During the transitional period between 1978-80, Rs. 2909.71 lakh rupees was allocated for state and central projects while 83.7% was utilized by the Center and 79.2% was utilized by the states. Most of the projects were for continuance of Intensive Sericulture Development Schemes which was being administered by CSB. Production of raw silk was augmented to 48.05 lakh kg from the level of 41.77 lakh kg in the previous year. On the export front, the achievement amounted to Rs.48.83 crores against the target set of Rs.50 crores for the year.

During the Sixth Plan (1980-81 to 1984-85), the Planning Commission allocated Rs 16737 lakh for the implementation of state (Rs. 13637 lakh) and central (Rs.3100 lakh) projects. The utilization-allocation ratio was more than 100 percent for the central projects and 65.4 % for the state projects. The production of raw silk was 76.73 lakh kgs and export earnings were Rs. 129.00 crores against the target of Rs. 100 crores. In the year 1980, an International Centre for Training and Research in Tropical Sericulture (ICTRETS) was established in Mysore under the Indo-Swiss Technical and Scientific Programme to provide advanced sericulture training to the rural artisans. In 1981, the National Silkworm Seed Project was established to extend the activities of systematic seed organization through proper linkages between seed production centers and three tier basic seed multiplication farms and to supply basic seeds to seed cocoon growers in different parts of the country (CSB, 1999). A Central Silk Technological Research Institute was set up at Bangalore to deal with the problems of post-cocoon technology at some point in 1982-83. During this plan period, inter-state *tasar* project of Rs. 11.56 crores under Indo-Swiss Development Program was implemented and an additional area of 7,850 hectares of forest land was brought under *tasar* food plants[2]. This benefited 7,850 families in the *tasar* grown areas of Bihar, Madhya Pradesh, Orissa, West Bengal, Andhra Pradesh, Maharashtra, Uttar Pradesh and Rajasthan. On the other hand, a *muga* seed development plan was launched in North Eastern Region to produce and supply 100 crores of *muga* commercial dfls[3] to the tribal rearers. The Central Eri & Muga research stations at Titabor (Assam) was reorganized and separate regional research stations were set up at Boko (Assam), Titabbor (Assam) and Mendipathar (Meghalaya) for *muga*, mulberry and *eri* silk respectively. To provide more assistance in marketing of *tasar*, two sub depots of RMBs (Regional Marketing Blocks) one each at Raigarh (Chhattisgrah) and Bhagalpur (Bihar) were established by the Central Silk Board. Karnataka government had launched a project with the assistance of World Bank during this plan involving an outlay of Rs.101.13 crores for the development of sericulture in the state. The project inter alia envisaged providing of necessary R&D support by CSB and to accomplish that support CSR&TI, Mysore was further strengthened (ibid, 1999).

Before the appearance of liberalization in the Indian economy, the Seventh Plan was the last plan which allocated Rs.310.78 crores of budget for implantation of different state and central projects in sericulture. The utilization-allocation ratio remained higher for the central projects

(125.9%) than the state projects (85.9%), though the ratio was improved for states compared to the previous planning periods. By the end of the plan period, production of raw silk reached the level of 12016 tonnes and silk export earnings amounted to Rs.400.61 crores. Thirteen sericulture training schools for farmers have been established in various states under TRYSEM[4] to impart training to farmers in sericultural aspects for self–employment. Multi-end reeling machines were introduced and partly subsidised by CSTRI, Bangalore. Intensive Sericulture Development Project amounting to total outlay of Rs. 967 lakh was introduced in West Bengal. The project envisaged expansion of area under improved mulberry varieties by 4000 acres besides developing infrastructure for encouraging the systematic seed production, supply and marketing of cocoons. In Orissa, Bivoltine Sericulture Development Project was implemented which included development of 1000 acres of mulberry in tribal area and infrastructure for seed production, cocoon marketing and reeling. The total cost of the project was Rs. 427 lakh which was shared by Central Silk Board, Government of Orissa, Financial Institutions and NCDC etc. Similar to this, a follow up project with the assistance of Swiss Development Corporation was launched in Maharashtra. Like mulberry, Muga Seed Development project was established by CSB during Sixth Plan for the development of Muga silk industry. The infrastructure development under this project continued as a normal development program of CSB, while those set up under the State sector were handed over to the respective state governments. During 1989-90, the terminal year of Seventh Plan period, Central Silk Board and Department of Sericulture in five traditional states viz, Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Jammu & Kashmir initiated National Sericulture Project (NSP) over a period of seven years for the development of mulberry sericulture in the country with a credit line from IDA of 113.87 million SDRs and grant from SDC of 25 million US Dollars. The project envisaged expansion of mulberry by bringing in additional area of 55,000 hectares, while setting the target of incremental raw silk production of 6072 tonnes, introducing sericulture in new states generating additional employment to one million persons and improving the quality and productivity of Indian silk strengthening infrastructure for Research Extension, Seed Production, Processing, Quality Control and Marketing of Cocoons etc. During this Plan, the performance of bivoltine silk was very disappointing, i.e., in the tune of 150 tonnes against the set target of 500 tones. The export of silk made-ups and silk-goods were, however, satisfactory. The imports of silk were doubled from about 1181 tones in 1984-85 to about 2500 tonnes in 1989-90 ((Compendium of Statistics of Silk Indudtry-1999).

The growth rate of silk production during 1950-85 was at 6.4 per cent (Sinha, 1989). It was high in the early 1950s but relatively slow after that until the late 1970s.The country which merely produced 825 tonnes of raw silk in 1950-51, increased to 11488 tonnes, which actually witnessed around 14 fold rise within four decades. The increase in mulberry acreage was also more than six folds. From 0.05673 million hectare in 1950-51 it increased to 0.3131 million hectare. Productivity parameter also revealed a significant increase, i.e., from 14.54 kg/ha in 1950 it rose to 36.690 kh/ha. This stupendous growth was possible more due to acceleration in the later decades as greater and greater amounts of allocated funds were being properly utilized. But Lakshmanan and Geetha Devi (2000) commented that even this remarkable growth was not a significant achievement compared to China and Japan. It was estimated that the realization of the mulberry yield per hectare was to the extent of 20-25 metric tones /ha while the potential yield would be 35-40 metric tones/ hectare. According to the findings, the reasons included low level of adoption of cultivation-practices by farmers, low scale of replantation of hybrid varieties, lack of irrigation facilities (as evidenced by more than 70 percent of plantation under rain fed condition) etc.

Another major constraint due to non realization of potential yield is for the low-yielding variety of silkworm races. Indian sericulture is totally hinging on multivoltine[5] silkworm varieties or crossbreeds[6] which have relatively poor yields (CSB database, 2007). The cocoons produced by these varieties are unsuitable for reeling in sophisticated reeling machine and the raw silk produced by these breeds are characterized by lower filament length and lesser tensile-strength[7] leading to breakages making it unfit for high speed powerloom weaving (Kumaresan et al., 2002). These made the power-loom of the silk industry heavily dependent on the imported Chinese raw-silk which is of superior quality (Vasumathi, 2000 and Thomas et. al., 2005). The import of raw silk (both mulberry and non-mulberry) rose from 26 tonnes in 1971 to 641 tonnes in 1981 and 1380 tonnes in 1990. This huge demand of imported raw silk is justified through the intensive requirement of raw silk by the power-loom weavers. On the other hand, the indigenous raw silk is largely consumed by the handloom sector and partly by the powerloom as weft[8] (Vasumati, 2000). These crossbreeds and multivoltine varieties are largely cultivated as it suits with the local environment. Besides, the technology diffusion of the improved bi-voltine variety is also low in sericulture rich states too. Due to backwardness of the mulberry silk sectors at farmer-artisan level, the rate of technology adoption of such improved variety is within 5-10 percent (Lakshmanan and Geetha Devi, 2000). The next subsection will deal with the problems faced by the silk manufacturers in India during the reference period of time.

Table 4.3: Performance of Indian Mulberry Silk Sector during 1950-1990

Year	Area under Mulberry (million hectare)	Mulberry Raw Silk Production (tones)	Productivity (Kg/hectare)
1950-51	0.056	825	14.542
1960-61	0.083	1264	15.237
1970-71	0.094	2258	27.018
1980-81	0.17	4593	27.018
1990-91	0.31	11488	36.69

Source : Lakshamanan & Geetha Devi (2000)

Table 4.4 Production & Import of Raw Silk in India during 1971-1990 (in tonnes)

Year	Production of Raw Silk (tones)			Share of Import in Domestic Availability (%)	Raw Silk Import (tones)
	Mulberry	Non-mulberry	Total		
1971-72	2046	554	2600	0.99	26
1975-76	2541	526	3067	2.82	89
1980-81	4593	448	5041	5.95	319
1985-86	7029	868	7897	18.28	1767
1990-91	11486	1074	12560	15.00	1598

Source: CSB (1999), DGCIS, Calcutta

Silk production in India is largely oriented for domestic market. India is the largest consumer of silk in the world which provides an extra edge to this motivation. An analysis of the availability and import contribution to domestic availability during the post-independent and pre liberalized India portrays a picture which shows how the overall availability of silk

(including both mulberry and non-mulberry) has been considerably expanded by the share of imported raw silk. The import share in domestic availability had touched the level of 18.28 per cent during 1985-86 and from 1971-72 to 1990-91 the percentage increased almost fifteen fold, i.e., from 0.99 to 15.00 respectively. This import growth was both for reeled and spun silk. Sinha (1989) opined that domestic consumption is equivalent to availability deducting the exports and that appeared around 80-90 percent of all available raw silk. During this pre-liberalised phase, it has been found that domestic consumption had exceeded the domestic production which is justified with the rising trends of imports during pre-liberalized phase (See Fig-1). Similarly, exports have grown tremendously starting form 0.52 crores in the First Plan to Rs. 400.61 in the end of the Seventh Pan period. Within 40 years of independence the exports rose to 40 fold from the initial level of economic planning. The percentage growth accelerated from Fourth Plan onwards and it was phenomenal in Sixth and Seventh Plan periods.

Figure 4.1: Imports of Raw Silk by India (1971-1991)

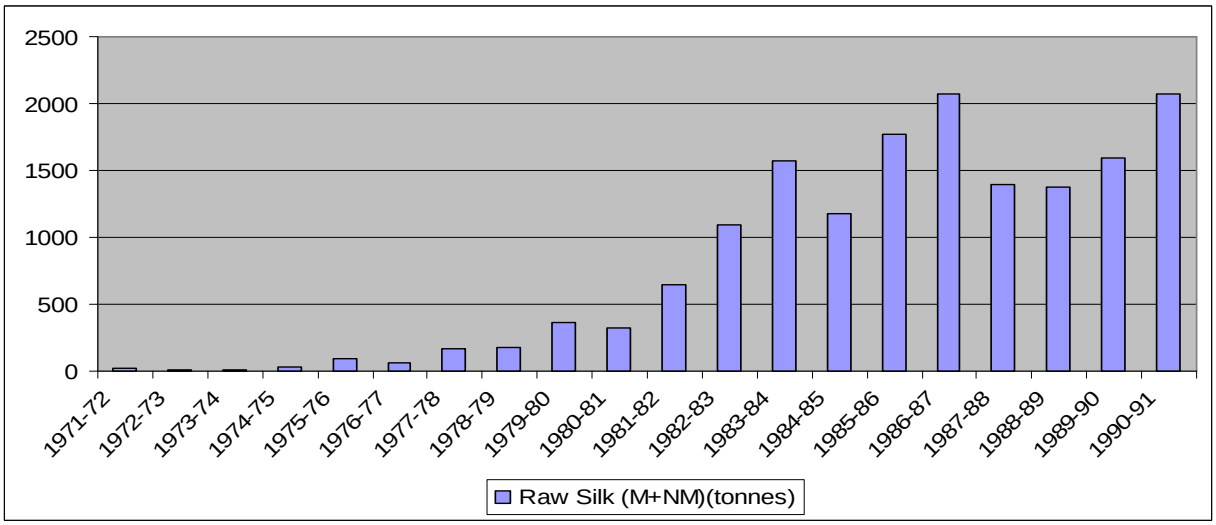


Table 4.5 Certified Exports of Silk Goods & Silk Wastes during 1950-1990

(Rs. in Crore)

Plan	Silk Goods	Silk Waste	Total
First Plan* (1951-56)	0.26	0.26	0.52
Second Plan* (1956-61)	1.04	0.48	1.52
Third Plan* (1961-66)	2.68	0.64	3.332
Transitional Period (1966-69)	6.37	0.46	6.83
Fourth Plan (1969-74)	12.37	2.09	14.46
Fifth Plan (1974-78)	31.60	1.46	33.06
Transitional Period (1978-80)	47.57	1.26	48.83
Sixth Plan (1980-85)	125.33	3.72	129.05
Seventh Plan (1985-90)	392.48	8.13	400.61

*refers to calendar year; Source: CSB (2003)

From 1969 to 1980 the annual growth rate of silk exports was 11.7% while if we extend the duration period to 1969-1990, we will observe an average annual growth of 17.1%. The corresponding growth of imports during 1971-1980 & 1971–1990 was 32.1% and 24.2%.

Therefore, though Sinha (1989) spoke about healthy growth of net trade surplus in silk during 1978-79 to 1986-87 from Rs.41 crore to Rs.140 crores at a rate of 11.4 percent, high import dependence of Indian silk sector had been clearly exhibited during this pre liberalisation period. In 1970, India's production rank was at 3, producing 5.6 percent of global raw silk which within 20 years changed to 15.4 per cent of global share including upgradation of production rank to 2. However, India remained all along a leading consumer of silk.

The high demand in domestic market kept the silk sector ever-expanding and widens up job opportunities in an extended market. With the increasing demand in export and more importantly in domestic market, sericulture acts as an income generating as well as employment boosting sector in the pre-liberalised regime. Though the macro-level data in this reference period is far from comprehensive, Planning Commission in their Sixth Plan documentation indicated that employment was at 16 lakh persons in 1979-80 (GOI, 1980), while Statistical Beinnial (1986) of the Central Silk Board declared employment at 51.52 lakh during 1985-86. This leads us to infer that approximately the employment growth rate during the pre-liberalised phase in India was annually at 21.5%.

4.3 Problems of Sericulture & Sericulturists in Independent India

This section will attempt to address twin issues - the first is to discuss the overall problems of sericulture in India during pre-liberalized regime and then it will delve into the major issues specifically faced by the farmers and artisans in their process of production. It has been grossly identified by many researchers and commentators that Indian sericulture was void of modern concepts during that pre-liberalised period which included ecological farming, sustainable sericulture and location specific research and development (Thangavelu, 1993). Quality of Indian silk was very low as capacity to absorb technology which depended on several socio economic factors prevented the use of technology intensive production procedure by the Indian sericulturists. Due to fluctuating prices of raw silk which again provoked fluctuating income uprooting of mulberry plantations seemed to be common phenomena during this phase. There was also frequent outbreak of silkworm diseases and parasitoids (i.e., an insect whose larvae live as parasites which eventually kill their hosts) which used to kill the entrepreneurial spirit of many silk artisans. Though several high yielding silkworm races and mulberry as well mulberry varieties were successfully evolved in laboratory research, very few of them were being popularized. For instance, the cocoon yield level of one particular cross breed silkworm race (Pure Mysore x Bivoltine) was predetermined in the laboratory at 40 kg/ 100 dfls under irrigated condition but in practical field the average yield of the said breed was around 20-30kg/100dfls. This reinforces our previous claim regarding gap between research work and implementation. This section will try to identify the causes behind the overall maladies faced by sericulture farmers and artisans.

In India, there are 100 mulberry varieties and evolved lines and climate of sericultural region varied from hot summer (exceeding 40^0C) to severe cold (4^0C). Along with climatic variations, soil types vary immensely across the region from sandy to clayey. Besides, mulberry is cultivated in different altitudes from coastal regions to hilly regions where sericulture is widely practiced. It has been observed by the scientists that there exists preponderance of few varieties over different varieties that can be practiced at variable soil and agro-climatic conditions. Unless these region specific varieties are properly recommended, sericulture sector would hardly be able to realize its true potential. Swaminathan (1991) pointed out that genetic diversity and location specific variety breeding

could help the sector in achieving its desired target. A similar approach could cure the problems of non-traditional regions too.

Silkworm races are also dominated by fewer races in practical field while more than 100 silkworm races are available in the country and more than 2000 silkworm strains are available across the globe. Despite the advantage of having diversified climatic zones, ideal for breeding of bivoltine species, Indian sericulturists largely produce crossbreed races (multivoltine female x bivoltine male). *Nistari* is a popular multivoltine race widely cultivated in West Bengal. Bivoltine races fetch higher returns and it has larger demand in foreign market due to its premium quality. However, Indian sericulturists were averting a practicing bivoltine race which according to the analysts was due to lack of climatic congeniality. It was suitable for the temperate climate of China and Korea but not for India's tropical climate (Chandranath, 1995). Besides, bivoltine cultivation involves a greater percentage of risk factor while the return which may be lower but assured for the multivoltine variety. Thus the bivoltine rearers have a high chance to end up with greater penalty for undertaking those risks which keep them averted from rearing bivoltine. Sinha (1989) called for an introduction of incentive prices where bivoltine can be sold at premium prices over cross-breed depending upon the associated perceived risk factor in bivoltine cultivation. Attempts have been made later in 1997, under the 'Project for promotion of Popularising the Practical Bivoltine Sericulture Technology (PPPBST) with Japan International Technical Co-operation in breeding region specific qualitative race. Convergence of mechanism is highly required for successful implementation of these schemes. Unless the fruits of innovations are being practiced largely in the field no tangible development is practically possible. The success of China and Japan was mainly due to transfer of technologies in the field to a large scale (Laksmanan and Geetha Devi, 2000). India's rank in this performance report is abysmally low.

Price volatility is another feature which constantly worsens the situations of several stakeholders associated with artisanal silk industry, starting from farmers, reelers, twisters to weavers and traders. Issues related to every other silk producing and processing sections are discreetly heterogeneous. Crossing this flow chain while some stake holder derives the advantage of price soaring, the counterparts are left with disadvantage and vice-versa. This has been indicated by Lakshmanan and Geetha Devi(2000) while explaining the dynamics of price fluctuations. According to them, the cost of production seemed to follow a rising trend while price of reeling cocoon remained constantly volatile and that made the farmers subject to poor returns on many occasions besides frequent crop loss due to outbreak of silkworm epidemic and environmental factors. Giridhar et al. (2011) provide a detailed explanation of these obvious price fluctuations. The vulnerability of sericulture, according to that explanation, depends upon vagaries of nature. Often a bad monsoon resulted in bad cultivation and shortage of cocoons which again led to pushing up of cocoon prices for the reelers. At the same time, Chinese raw silk might have been available in the domestic market at cheaper rate, which in turn might have forced the local reelers to undercut their prices. Another justification which was put forward for this lowering of cocoon price is regarding the short period of the shelf life of the cocoon. Since silk moth pierces out of the cocoon after a brief stipulated period making it unsuitable for reeling, the farmers always attempt to dispose off the cocoon even at throw away price. All these situations ultimately make the price of cocoon volatile in Indian sericulture.

Regulated marketing was introduced in cocoon markets in the 1970s in different states of India with the objective of controlling malpractices in dealings between weak sellers and

strong buyers. Price fluctuation and market speculation was expected to come to an end with the introduction of this regulated market. In 1985, Rayappa and Ajmal Pasha pointed out that after introduction of regulated market there had been no deceleration in price increase (Sinha, 1989). Cocoon price rose from Rs. 22 per kg in 1979-80 to Rs. 35 per kg in 1983-84, filature silk rose from Rs. 316 per kg to Rs. 445 per kg and charka silk from Rs. 250 per kg to Rs.375 per kg. By 1987-88, these had recorded further extensive increment of Rs. 70 per kg of cocoon, Rs.750-800 per kg of filature silk and Rs. 650-700 per kg of charka silk (ibid, 1989).

The fluctuating price of reeling cocoon leads to disruption in the raw silk as well as silk fabric markets, too. Price variations accentuated by seasonal supply fluctuations of cocoons actually imply that there must be some periods when no domestic reelers were in operative mode. On the other hand, cost of raw silk production keeps on escalating due to sporadic supply of cocoons and purchase of inferior cocoons. This causes less price realization. Besides, investment in silk growing and reeling sector increases abruptly due to increased cost of labour and raw materials.

Similar observations could be obtainable within weaver communities. Cheaper imported Chinese silk brings down the prices of both domestic reeling cocoon as well as raw silk causing frequent price volatility in the domestic market. The subsequent two sections will throw some light on the sericulture related issues of Karnataka and Andhra Pradesh which crafted their position ahead of West Bengal. Instead of merely weaving a success story the sections would explicate the factors through which the successes have been achieved by these states.

4.4 Performances of Artisanal Silk Industry in Traditional & Non-traditional Silk Producing States

Silk production has remained confined to five traditional states i.e., Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu and Jammu & Kashmir due to favourable agro-climatic conditions including temperature and humidity. Traditional skill and market potential was also available in these states. In response to the growing realization about the development impact of sericulture, artisanal silk industry has started gaining its ground in non-traditional states too. From the available statistics of 2011-12, the five traditional silk producing states collectively produce 97 % of the silk production in the country leaving 3% to be produced by the non-traditional states (CSB-Annual Report, 2011-12). The performance of the five traditional states is discussed below along with that of the non-traditional silk producing states in India. Prominent non-traditional silk producing states are Maharashtra, Uttar Pradesh, Manipur, Madhya Pradesh, Mizoram, Himachal Pradesh, Assam and Bihar.

4.4.1 Karnataka

Sericulture in Karnataka bears a glorious history of 215 years. It was initiated by the Tiger of Mysore, Tipu Sultan, in 1785. His dream of upgrading Mysore Silk the equivalent world-class silk was fulfilled in the later periods. It reached its distinct place through many ups and downs. During the early decades of 19th century when Bengal silk was on its wane, Mysore silk survived the shock and continued its prolonged journey. In 1800, the Royal Government of Mysore established sericulture in Mogenahalli near Channapatna, which gradually became the centre of sericulture activities in Karnataka. In 1880, an Italian industrialist founded the first silk filature in Bangalore. During this period various races were used to cross breed layings for this silk filature. In 1896, Tata set up a silk farm with a filature attached to it in

Japanese pattern in Bangalore. In the first half of the 20th century, the architect of Mysore M. Vishveshwaraiah stressed much emphasis on sericulture for rural development. He hired the services of Signor Washington Mari from Italy to organize and develop silk industry in Mysore, who brought twelve varieties of pure European and Chinese silkworms to conduct experiments.

Karnataka is the largest silk producing state in India. The state accounts for more than 60 percent of silk production in India (Exim Bank, 2002) Sustained efforts of Government of Karnataka have resulted in the spread of sericulture all over the state and increase in production of cocoon and silk. Though all the districts are practicing sericulture, the five major which account for over 50 percent of sericulture cultivation are Bangalore, Kolar, Mandya, Mysore and Tumkur. The World Bank assisted Karnataka Sericulture Project implemented during 1980-87, which helped to build up the infrastructure and laid emphasis on expansion. The National Sericulture Project (1989-96) further helped the state to strengthen the sericulture in the state. According to recent accessed (3rd April, 2014) CSB online statistics, sericulture is practiced in 11835 villages of Karnataka where 141528 families are involved with this rural avocation. Among them only 10.4 percent belong to the backward classes, i.e., SC and ST. This confirms that sericulture is also being taken up as a livelihood choice by upper castes in the society in Karnataka. 351 total grainages are available including both mulberry and wild silk. 246 technical service centres are catering the need of the sericulturists to bring down the laboratory research into direct field. This is the highest number of TSCs available in any state which in a way explains the leading status of the state. The other significant infrastructure like Cocoon markets and Silk Exchanges are also highest across the states, i.e., 66 and 10 respectively. 7358 silk reelers and 180 lakh weavers are operating in the state, while the number of handlooms and powerlooms are 18000 and 35000. The higher number of powerloom also points toward better quality of raw silk availability in the state. However, the average productivity and quality of multivoltine raw silk is lower than that of China. The number of registered cooperative society is only 85.

According to Nandur (2000), the constraints of Karnataka in producing international quality of silk lies in its nature of soil which contains less organic matter and thereby making it unsuitable for sufficient mulberry cultivation. This in turns affects the quality of leaf. A few silkworm races are only available due to insufficient development of technology and inadequate synergy between laboratory and TSCs as well as low adoption rate of technological expertise. This results in low productivity per unit area. The silkworms produced are susceptible to various diseases and hygienic conditions that can not be sustained as the vast majority of farmers conduct rearings in dwelling houses. The pathogen[9] load is high due to improper disinfection which ultimately results into crop losses. Separate rearing houses are not available with most of the sericulturists. Thus quality cocoons can not be ensured uniformly. The reeling sector is also unorganized. Reelers use devices without quality consciousness. The quality silk is not gradable and fetches low prices. Quality linked price for cocoon and silk is not available in the cocoon and silk market (Nadadur, 2000). However, performances of some sericulturists in the state are very commendable which is why Karnataka excels in silk production compared to other states in India. The quality of cocoons produced by these farmers is no way inferior to the cocoons produced in China. The silk reeled out of such cocoon is superior with improved renditta[10]. The silk produced by some reelers is of 2A grade and above which is equivalent to international standard.
Originally, the Mysore Race with yellow colour cocoon, which was an indigenously developed race, was reared. Later hybrids with better yields and resistant to diseases were introduced. In the 1980s, the Bivoltine hybrids have been introduced which increased the

production parameters both in quantity and quality scale. In order to retain the purity of the races two separate seed areas have been classified by the state, one which is called Mysore race seed area and the other is bivoltine seed area. The former includes Kunigal taluka of Tumkur district and Magadi and Ankel taluka of Bangalore district. The rest of the state is permitted to grow the hybrids as also the pure races of Bivoltines (Bindroo and Verma, 2014).

4.4.2 Andhra Pradesh

Andhra Pradesh occupies second position in production of silk in India and accounts for 19 percent of national production of silk. Although 22 districts are involved in production of silk, mulberry acerage is mainly concentrated in the duought prone areas of Rayalseema, particularly in districts of Anatapur, Chithoor, Kurnool and Cudappah. Tasar sericulture is practiced in Adilabad, Karimnagar, Warangal and Khammam districts. Sericulture avocation has been possible in these regions mainly due to rich soils and ideal agro-climatic conditions. The small and marginal farmers also took intensive care which was responsible for successful silkworm rearing in the state. There is a well organized three tier system of seed organization in the state to meet the requirement of foreign race and local race of cocoons needed for the production of hybrid layings and thereby satisfying the demand of the sericulturists.

Andhra Pradesh has its own Regional Training Centres to cater to the needs of the front level functionaries and sericulturists. In addition to that a well equipped Reelers Training Centre is also established in Chittoor district for training the entrepreneurs, supervisors and workers. The state has also got a strong and traditional weaving base with 1 lakh 25 thousands handlooms and 600 powerlooms. Under National Sericulture Project (NSP), Andhra Pradesh State Sericulture and Development Institute has been established for evolving high yielding mulberry varieties, region and season specific silkworm races. Kuppam, Paderu and Vikarabad have been chosen for cultivating bivoltine silk and thereby producing international grade silk. Cultural heritage of silk and weaving patterns in Pochampally, Gadwal, Narayanpet, Dharmavaram, Venkatagiri, Patru and Peddapuram offer abundant opportunities for the farmers, reelers and twisters to avail forward linkages with weavers in their immediate neighbourhood. According to CSB (accessed on 4th March, 2014) silk reelers available in Andhra Pradesh are in the tune of 1612 while 125600 weavers are attached with silk weaving in different corners of the state. As a whole 115665 families are involved with this rural vocation in 6483 villages while 8.70% are from backward communities. This indirectly establishes that sericulture is not only practiced by the members belong to the backward communities but also to a greater extent by the upper caste community people in Andhra Pradesh.

Several socio economic surveys affirmed that the cost-benefit ratio of sericulture is highest among comparable agricultural cash crops. It generates a steady income of Rs. 45,000 annually from one acre of mulberry field for its practitioners, if four or five times cultivated. The industry has immense potential to generate employment of 5 persons throughout the year from 1 acre of cultivable land. However, Venateswarlu (2000) mentioned some constraints responsible for its inability to reach its potentials, Adverse climatic and unhygienic conditions prevailing in rural areas are responsible for low productivity of the field. There exist weak linkages in post cocoon operations and inadequate availability of region and season specific races. Silk weavers are adhered to traditional weaving methods and wide gap between technological advancement and field level practice.

To promote the artisanal silk industry at par with international level, Andhra Pradesh Sericulture Department provided 5% interest subsidy on working capital for the reelers having cottage and multiend basins so that interest burden on the entrepreneurs could be reduced to some extent. Department of Sericulture encouraged the setting up of improved multiend reeling machines besides producing quality bivoltine cocoons in selected pockets. Since the price of silk yarn is fluctuating, the information about this market has been made available to the cocoon buyers so that they can judiciously revise their decision. There are about 324 silk weaver's cooperative societies covering about 125 thousand silk weavers. These cooperatives perform a multi-level tasks to promote situation of the weavers class, which includes market development assistance, assistance for worksheds, assistance for training, modernization of looms, godown, design development. Apart from the state and central schemes, the department also implements CSB schemes and externally added scheme like Seri 2000 for stimulating productivity and quality of both bivoltine and multivoltine silk.

4.4.3 West Bengal

West Bengal ranks as third largest silk producing state, manufacturing all four varieties of silk in India. It contributes more than 8 percent of silk produced in the country. Mulberry sericulture is practiced in almost all the districts, though Malda, Murshidabad and Birbhum are the three significant silk producing districts. Tribal population in Birbhum, Bankura, Burdwan, Purulia, and Midnapur districts produce *tasar* silk. *Eri* silk production is done in the traditional district of Jalpaiguri and *muga* silk has made inroads in Coochbehar and Jalpaiguri. Sericulture is practiced in 2523 villages and 120449 families are involved with this livelihood. This reflects that spatial concentration of sericulturists is largest in West Bengal and more than 32 percent of those families belong to backward communities which imply that inclusive development in West Bengal is possible through promotion of sericulture. The number of reelers and weavers are 7428 and 31,260 respectively. West Bengal has largest number of reelers and lowest number of weavers compared to the other three traditional silk producing states leaving Jammu & Kashmir. This will be discussed at length in the forthcoming Chapter-6.

4.4.4 Tamil Nadu

Tamil Nadu is the fourth largest traditional silk producing state in India and accounting for around 5 percent of country's silk production. Sericulture cultivation was initiated in 1956 in limited pockets of Coimbatore and Dharamapuri district with mulberry cultivation in an area of 500 hectares. After implementation of many developmental schemes sericulture activities were introduced into the plains of the state. Starting from an acreage of 300 acres of mulberry and negligible silk production in 1956 the state has reached production level of 600 tonnes of silk in the turn of the century (Swain, 2000), This has been made possible with flow of resources from various schemes, such as Integrated Rural Development Programme, Integrate Tribal Development Program, State Sector Plans and World Bank Aided National Sericulture Project. Sericulture in Tamil Nadu had long been confined to a few districts alone. However, the introduction of the Intensive Sericulture Development Programme by the Government of India, in the Seventies, led to a rapid expansion of sericulture in the state. The National sericulture Project (NSP), initiated in 1989, has become a boon to the development of sericulture, bringing more districts with substantial sericulture concentration in the sericulture map of Tamil Nadu. Dharmapuri district in the north western region of Tamil Nadu, which is bordering Karnataka state, is the pioneering district in Tamil Nadu, in going for sericulture in

a big way. Its share in the total sericulture output of Tamil Nadu has been over 60 per cent. As on 1 April 1993 - as the records of the Department of Sericulture, Tamil Nadu show, mulberry occupied an area of 12,200 hectares in the district, constituting about three per cent of the total cropped area of the district. The irrigated mulberry area accounts for about 83 per cent of the total mulberry area and forms about 12 per cent of the net irrigated area of the District (Thayammal, 2011).

There are 23 sericulture divisions under the Department of Sericulture, Tamil Nadu. These are spread over 22 districts of the State. Significantly, five sericulture divisions are located in the Dharmapuri district alone. These include Pennagaram, Hosur and Dharmapuri. Each sericulture division is under the jurisdiction of an Assistant Director of Sericulture. Till 1995, the emphasis was mainly on expansion of mulberry acreage and creation of balancing infrastructure such as, grainages, markets and reeling units to support the increasing production from an expanding acreage. However, entry of Chinese silk in 1992 and subsequent fall in domestic prices brought in a lot of instability in the sector including uprooting in certain areas and since then caused a reorientation of strategy for future development in artisanal silk industry in Tamil Nadu.

Chinese silk price is 40% less than the domestic price and therefore the only way to withstand this competition is to make the price more competitive by raising the cocoon productivity and the silk content in cocoons to assure a renditta of at least 8. The planners decided that this would ensure higher income to the farmers even in a situation of falling cocoon prices and would thus stabilize the mulberry area too.

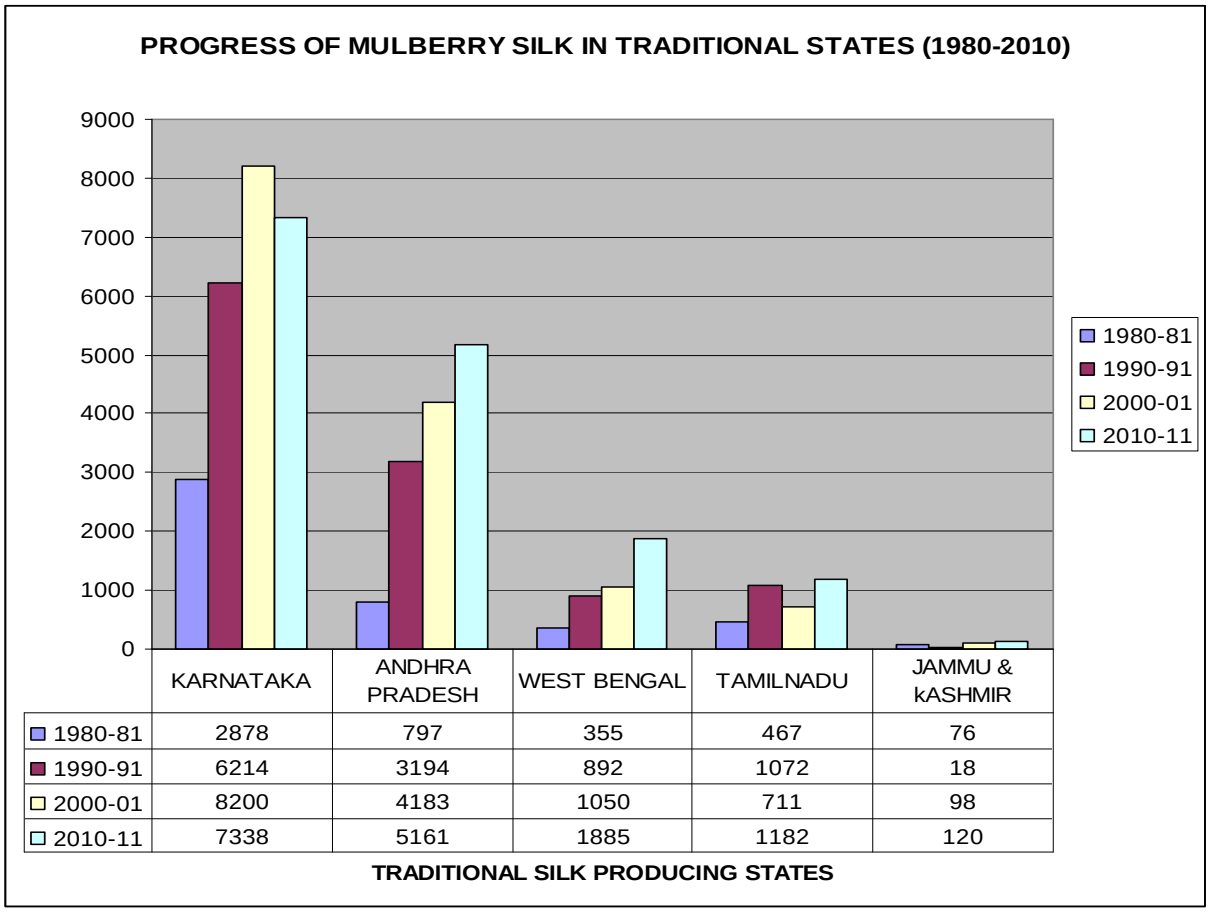
Presently, sericulture is practiced in 26 districts of the state and five major districts amongst them are Dharmapuri, North Arcot, Erode, Salem and Coimbatore. These five states alone produce 60 percent of the state's production. Sericulture is being practiced in 4674 villages and 22633 families are involved with this village out of which 6.13 percent belong to backward communities like SC and ST. The number of reelers and weavers are 333 and 60,000 respectively. This reveals strong weaving base of the state. In fact, Tamil Nadu is well known for its traditional silk saree and dhotis woven on handlooms. Presently, Tamil Nadu has 55 thousands of handlooms. Kancheepuram, Arani, Kombakonam, Salem, Coimbatore, Madurai and Tirunelveli are pronounced weaving centres in Tamil Nadu. Infrastructure facilities include 22 grainages, 105 TSCs, 19 cocoon markets and one silk exchange.

4.4.5 Jammu & Kashmir

As we have noted earlier, sericulture industry in Jammu & Kashmir is very old origin. The Department of Sericulture was created in the year 1889 under the monopoly control of the British Government to promote the silk industry in the state. A very good infrastructure including mulberry nurseries, silkworm seed stations and silk reeling and weaving factories were established which made Jammu & Kashmir one of the leading states in the pre Independent period of India. Sericulture was virtually the only cash crop available to the people of Jammu & Kashmir at that time. By 1940, about 52 thousand families were engaged in this activity and the production of cocoon was 1500 lakh kgs. Silk yarn, apart from its use as textile fibre, was also being used as materials for parachutes. In post Independent India cultivation of mulberry plants in Jammu & Kashmir was monopolized by the state government and private entry in the cultivation was totally restricted. The Jammu & Kashmir Mulberry Plantation Act, 1949 regulates mulberry tree production in the state and the Kashmir Silk Production Act, 1964 prohibited unauthorized cocoon production and

transaction in the state covering both cocoons and raw silk. There are 12 districts, which are involved with silk production in the state. However, it has been flourished in the rainfed areas of Rajouri, Udhampur and Kathua districts because mulberry being deep-rooted plant gives leaf during the whole season. Sericulture has been taken as subsidiary occupation in these districts and more than 4000 families especially women are involved with it. The marketing of cocoon is assured as it is organized by the department itself.

Fig 4.2: Mulberry Silk Production in Traditional Silk Producing States in India (in metric tones)



	KARNATAKA	ANDHRA PRADESH	WEST BENGAL	TAMILNADU	JAMMU & kASHMIR
1980-81	2878	797	355	467	76
1990-91	6214	3194	892	1072	18
2000-01	8200	4183	1050	711	98
2010-11	7338	5161	1885	1182	120

According to the statistical database provided by CSB (accessed on 4th April, 2014), sericulture is being practiced by 27 thousand families in 2262 villages of Jammu & Kashmir. 26 percent of these families belong to backward communities. The number of reelers and weavers are 21964 and 5000 respectively. Jammu & Kashmir has the largest number reelers and lowest number of weavers among the five traditional states. The infrastructural facilities include six grainages, 101 Chawki Rearing Centres, 25 cocoon markets and 2 silk exchanges. The number of handlooms and powerlooms are 18 and 119 respectively. During 2008 to 2012, the silkworm rearers have increased from 5568 to 8339 while the cocoon production rose from 254.2 MT to 305MT registering annual growth of 6.26 percent while income generation rose from 140.67 lakh to 350lakh.

4.4.6 Artisanal Silk Industry in Non-Traditional Silk Producing States

There are 12 non-traditional silk producing states which have taken up sericulture under the World Bank aided National Sericulture Project (NSP). These states are Assam, Bihar,

Gujarat, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan and Uttar Pradesh. Around 90 percent of the total silk consists of mulberry silk in India and within that contribution of the non-traditional states is only two per cent (CSB, 2003). In the 1980s, mulberry sericulture was spread to non-traditional states like, Kerala, Maharashtra, Rajasthan, Arunachal Pradesh, Sikkim and Gujarat. While other crops/ grains perish due to very little precipitation, mulberry survives such acute climatic conditions where even ground water is also not available for raising crops.

As we have noted earlier that non-mulberry silk is called Vanya Silk which comprises of eri, tasar and muga. Although all four varieties are cultivated in India, mulberry silk alone produced 80 percent of the country's total silk production in 2010-11. Nonetheless, Jharkhand, Bihar, Madhya Pradesh, Orissa and Chhatissgarh are leading tasar silk producing states, where silkworms are fed on leaves of Oak, Asan and Arjun trees. *Eri* silk, on the other hand is spun from cocoons belonging to *saturniidae* family, which are fed on castor leaves. Assam, Bihar, Meghalaya and Manipur are the leading *eri*-silk producers, while *muga* silk is only being produced in Assam from the cocoons of silkworms belonging to the *saturniidae* family and are fed on som and soalu leaves. *Muga* silk has rich golden colour.

The statistical data base reveals that sericulture is being practiced in 22960 villages by 4.88 lakh sericulture families (CSB, 2003). Within the sericulture families 12.7 % belong to the SC communities while 50.1% of the sericulture families belong to the tribal belt. It confirms that sericulture is chosen as livelihood options in the poorer tribal belt in these non-traditional states. These non-traditional states involve 4.12 lakh of weavers while most of these sections belong to Uttar Pradesh, Assam, Manipur, Bihar, Jharkhand and Maharashtra. On the other hand, more than 2000 rearers are from these non-traditional states of Bihar and Assam. Infrastructural facilities including grainages, TSCs (Technical Service Centres) and CRCs (Chawki Rearing Centres) are 1111, 164 and 444 respectively while the number of handlooms and powerlooms are 10016 and 1184 respectively. The non-traditional states which have progressed outstandingly during the last few decades were Maharashtra, Madhya Pradesh and Uttar Pradesh. Efforts provided by different development agency (like, BAIF Development Research Foundation etc.) in promoting mulberry and tasar sericulture in post technology refinement stage have proved to be a success in leading non-traditional state like Maharashtra. Sericulture not only provided a better livelihood opportunity to the downtrodden of the state, but also resulted in gainful self-employment at the door step of the farmer-artisans. These resulted in enhanced household income and reduced the tendency of migration especially in tribal families (Patil et al., 2009).

Table 4.6 Performance of Non-Traditional States in Mulberry Silk Production

(in Metric Tones)

Non-Traditional States	1980-81	1990-91	2000-01	2010-11
Assam	7	18	17	18
Arunachal Pradesh	Negligible	1	1	3
Bihar	1	65	3	18
Chhattisgarh	-	-	2	6
Haryana	-	-	-	2
Himachal Pradesh	2	5	13	0.2

Jharkhand	-	-	1	2
Kerala	-	3	4	26
Madhya Pradesh	-	11	3	104
Maharashtra	-	6	35	212
Manipur	5	23	57	97
Mizoram	-	0.4	4	26
Meghalaya	-	1	3	9
Nagaland	-	1	Negligible	3
Orissa	-	3	5	4
Punjab	-	1	Negligible	5
Rajasthan	-	1	Negligible	2
Sikkim	-	-	-	3
Tripura	-	2	4	8
Uttarakhand	-	-	15	20
Uttar Pradesh	5	21	23	86

Source : CSB (1999, 2003, online)

4.5 Process of Sericulture & its Impact on Artisanal Family Dynamics in India

The advent of the British in India was also accompanied by a series of progressive development measures causing radical changes to the Indian society, in general, and for the rural society, in particular. The changes accelerated in post Independence. With most Indian population living in villages, rural development assumed immense significance in the planning process in independent India. As a matter of fact, rural development programmes may not evoke similar response from all sections of people, though it is assumed that ‘people everywhere respond to economic incentives perceiving their significance in much the same way as the managers' (Gabriel, 1991). In reality, there could be multiple responses, depending on multiple factors and situations. Sericulture as practised by the people of India after independence could serve either as meeting their subsistence needs alone or as providing substantial cash income. Elements of both aspects could also be present in the practice of sericulture only in varying degrees. Thus, sericulture could be viewed in continuities with both these aspects representing their extremes.

There are some basic indicators that could help in understanding the nature of sericulture practice in India after Independence. The level of subsistence-dependency, the intensity of family labour, the scale of operation, the extent of risk-taking and readiness to adopt new technology, etc., are some such indicators through which the development of this artisanal sericulture can be fathomed. Considering these aspects, artisanal sericulture in India could be defined mainly as an enterprise of subsistence nature in some areas, while as a full-fledged commercial enterprise in some other areas. It could also vary among different sericulturists of the same area. Naturally, the practice of sericulture as a commercial enterprise would entail a high cost technology and may appear to be more successful. On the other hand, at a subsistence level, it may be practiced as a way of life. Charsely (1982) conceives two categories of people: One who considers sericulture a 'practice' and the other who consider it as a 'business'. The differential responses and considerations are developed within certain conditions and situational compulsions. Sericulture, in a broader sense, implies all phases, in the process of silk production, starting from mulberry cultivation to weaving, with the inter-phases of silk-worm rearing, silk reeling and silk twisting. However, in a restricted sense, the term ‘sericulture’ has been referred to mulberry cultivation and the rearing phase of the

activity that leads to production of cocoons, the basic raw material for silk production. It is this phase of the activity that involves a majority of the labour force, employed in the whole process of silk production (Sinha 1989). There are two dimensions that constitute the practice of sericulture. One concerns the practitioners and the other concerns the practice.

The life span of silk worms is about 23 to 26 days. The rearing of silkworms starts with the appropriate growth of mulberry leaves that are used for feeding the silkworms. The farmer anticipates in advance, the time of maturation of the leaves and the scale of rearing. Assessing the situation, 'indent'(order in advance) is given to one of the government or private grainages for the required number of 'Disease Free Layings' (DFLs). At the appropriate time, the layings are procured and kept at home to complete the process of incubation and hatching. Incubation normally takes about ten days. Meanwhile, a few days before the actual hatching of the layings, preparations are carried out for accommodating and rearing of the hatched worms. The rearing trays and the sheds are cleaned and disinfected. Hatching generally takes place on the tenth day, from the date of its laying. Uniform hatching ensures a better crop. So, the rearers are expected to be skilled enough to identify the time of hatching and provide appropriate conditions, including appropriate temperature and humidity. When hatched, the tiny worms are fed with leaves chopped into tiny bits. Later, the worms are brushed into trays, preferably wooden ones, providing with adequate spacing for the worms. In the process of growth, the worms pass through five stages that are known as 'instars' before they reach the stage of spinning their cocoons and maturing into pupae. After each instar, up to the fourth stage, the worms undergo a period of respite during which they shed out their skins. This process is known as 'moulting'. During moulting, the feeding is stopped. This generally lasts for about twenty to twenty-four hours. The sericulturists get the much needed rest during these breaks. The time of moulting and its release has to be skillfully gauged for best results. Preventive measures, suitable to the situations are to be carried out to keep the worms safe from any possible attack of diseases. Some artisans prefer chawki-worms and thereby availing about 'ten-days' rest and at the same time foregoing the strain of preparing the chawki. The feeding is carried out at regular intervals. The worms are fed with mulberry leaves for three to five times a day depending on the general practice of the area. First feeding usually starts at the early hours of the day and the last feeding in the late evening. There is a direct correlation between the size and maturity of the worms and the maturity and chopping-size of the leaves that are fed to the worms. Adult worms are generally fed with fully grown leaves without chopping. In some areas, farmers resort to branch feeding instead of leaf feeding, as a traditional practice or as a result of labour scarcity. With the passing of days, worms grow in their size.

'Bed cleaning' is carried out as the bed becomes thicker with leaf-waste and with the litters of the worms. Simultaneously, trays are also increased, along with the growth of the worms. Consequently, work load increases multi-fold. As the worms near the process of reaching full maturity, preparations are carried out to get the mountages , also known as '*chandrikas*' ready for mounting the silkworms for cocoon formation. Worms are mounted as and when they are mature, the process of which may be stretched to two- three days. Once mounted, the worms engage themselves in the spinning of silk cocoons. At the end of the process of spinning, the cocoons are collected and cleaned. The cocoons are then taken to one of the regulated cocoon markets. The reelers come to the cocoon markets to bid for the cocoons. The cocoons, thus bought, are put to undergo further transformation, by way of reeling, in the process of silk production.

The entire process of rearing is repeated, generally with a gap of about a month unless there are alternative plots of mulberry available to go for rearing immediately. All these activities imply certain intrinsic features which are unique only to Indian sericulture. Gregory (1997) observed some such features in sericulture as follows:

- The activity is mostly carried out within or in proximity to the living premises of the artisans. The work is quite intensive in nature and is quite different from other types of agricultural activities.
- It necessitates one person to be a main participant in the activity who needs to involve and participate in the activity intensively for a continuous one month, at each rearing.
- The activity also demands equally supporting participants within the household for better results.
- To appropriate a successful crop, there needs to be perfect understanding and co-ordination among the participants who should also display a great dedication and commitment to the work.
- Since the work is carried out within or nearby the living premises, it almost becomes part of the household chores. This enables women to take an active part in the artisanal work without much affecting the traditional rhythm of a rural household.
- It provides opportunities for the main participants to have wider contacts, frequent interactions and greater familiarisation and networking. The sericulturists develop closer contacts with other participants in the same village, with the department officials and with other related agencies and fellow entrepreneurs from different areas.
- The frequent and substantial returns from the enterprise allow the main participants to claim credit for the achievement and assert their economic capacity. The same accomplishment equally demands a due recognition to be given to the other active and to a certain extent to the passive supporters too, within the family, if the enterprise has to sustain successfully.

4.6 Conclusion

The foregoing sections of this chapter attempted to throw some light on the initial few decades of economic planning in post independence period, where planners strived hard to restore the past glory of Indian silk. Although Central Silk Board was established prior to the inception of the planning period, separate allocation for this sector was introduced from Second Plan onwards. Multivoltine and Cross-breeds were the most preferred mulberry silk varieties widely chosen by the silk farmers in India possibly due to its easy technology and guaranteed returns. On the other hand, bivoltine silk is highly qualitative and have higher demand both in domestic superior powerlooms and in foreign markets. Rearing of this superior quality of Bivoltine variety was introduced in traditional states like Karnataka, Tamil Nadu and West Bengal in the early 1970s, while Jammu & Kashmir cultivated only bivoltine silk due to its temperate climate. However, in course of time, Tamil Nadu fared well than the rest of the traditional states and became the leading state in bivoltine production in 2011-12. In West Bengal, *nistari* multivoltine is largely popular across the sericulture rich districts and the state has negligible percentage of bivoltine silk production. The subsequent section also indicate some grave issues attached with the silk farmers and artisans, which include volatile price of silk cocoon and silk yarn, lack of region specific mulberry variety as well as inadequate coordination between technology yielding laboratory and cultivating field, competitive import price threat from China and infrastructural bottleneck across the states. Some of these acute situations call for immediate intervention from the government. On one hand, the successful performances of non-traditional states are confined within few regions

like Maharashtra, Madhya Pradesh and Andhra Pradesh, while traditional silk producing states have progressed ahead of the former. The imbalance in progress across the traditional and non-traditional states as well as within non-traditional states needs to be reduced through judicious policy decisions. The demand for silk is growing all over the world while India itself is the largest market of this product. Therefore, policy restructuring needs to be done in appropriate manner so that India could be self reliant on silk. The forthcoming chapter will throw light on emerging issues in the silk industry especially in the post globalisation phase when abolition of Multi Fiber Agreement opened vast opportunities and threats at the same time in the Indian domestic silk market.

End Notes

1. All India Sericulture Research Institute was merged with Central Sericulture Research & Training Institute in later phases.
2. Major food plants for Tasar silk worms are Terminalia Tomentosa and Terminalia Arjuna. Rearing of worms is conducted outdoor in the forest above these food plants.
3. Disease –free-layings i.e., disease free eggs of silkworm.
4. TRYSEM (Training of Rural Youth for Self Employment) scheme aimed at providing basic technical and entrepreneurial skill to the rural poor in the age group of 18-35 years, enabling them to take up income generating activities.
5. Multivoltine silkworm yields several times in a year and are largely cultivated in India despite their inconsistent and unsatisfactory performance. Nitsari is a popular multivoltine race cultivated in West Bengal.
6. Cross Breed (CB) is a hybrid variety between a indigenous multivoltine race (known for its hardiness) and a bivoltine breed developed in India. CB is comparatively easy to rear but produce relatively poor quality of silk.
7. Tensile-strength , here, refers to the maximum load that a silk fabric can withstand while being stressed.
8. Weft is the yarn which runs breadth-wise in fabrics. The required mechanical tensile strength is lower than the warp, which is run lengthwise. If the warp yarn is not strong enough, it is liable to break, rendering the weaving process difficult.
9. a bacterium or virus that can cause diseases.
10. improved renditta means lower renditta count which refers to the kilogram of cocoons required to yield 1kg of raw-silk.

CHAPTER: 5

Performance of Artisanal Silk Industry in Post Liberalisation Period (1990-2012)

5.1 Introduction

The foregoing chapter gives a clear picture about the situations of Indian Artisanal Silk Industry in the pre-liberalisation period in India. It has been observed that Indian artisanal silk industry was trying to move forward along a growth trajectory despite having several supply side bottlenecks and price volatility in cocoon market as well as in silk yarn market. In the textile policy of 1985, greater emphasis was given to modernize the silk industry through upgradation of technology and making it more region and climate specific. The policy also removed unnecessary controls and regulations on the existing units and regulations on the accessible units and closer of unviable mills. It has been observed that during 1989-90, the Central Silk Board and Department of Sericulture in five traditional silk producing states (i.e., Karnataka, Andhra Pradesh, Tamil Nadu, West Bengal and Kashmir) initiated 'National Sericulture Project' with financial assistance of World Bank and SDC over a period of seven years for accelerating the progress of mulberry sericulture in those states. Even in the pre-reform period (1985-90), thirteen sericulture training schools for farmers was established in various states under TRYSEM[1] to impart training to farmers on sericulture aspects and self employment (CSB, 1999).

Economic reforms in1991 brought some changes in the Indian industrial policies which sought to deregulate industries and expose firms to international competitions. The process of globalisation welcomed various potential entrants by reducing the trade barriers. The simple mean tariff was reduced from 80 percent to 30 percent within 1990-2001. The share of product subject to quota restriction decreased from 87 percent in 1987-88 to 45 percent in 1994-95. In 2001, 35 percent of tariff line was freed from non-tariff barriers which facilitated many exportable commodities where intermediates are imported in large volume. It has already been discussed how the silk industry has experienced high import dependence since the inception of the Planning periods. Besides this issue, globalisation has also abolished the system of licensing and the list of reserved small scale industries was also removed from textile sector. This undoubtedly opened up the scope for multiple domestic farms in this sector to show their inherent excellence in textile sector including silk industry. At the onset of globalisation, this long term change has brought Indian silk industry at cross-roads which would be studied at length in this chapter. Section 5.2 will analyse the impact of globalisation on the artisanal silk industry with special reference to China's membership-participation in WTO, while section 5.3 will enlighten the impact of Multi-Fibre Agreement on artisanal sections of the silk industry. Sections 5.4 will make a comparative study of the impact of trade liberalisation on both artisanal and non-artisanal sections of the silk industry, while section 5.5 will analyse regional inequality and trade openness and the following section 5.6 will conclude the chapter showing some way ahead.

5.2 Impact of Globalisation on Indian Artisanal Silk Industry

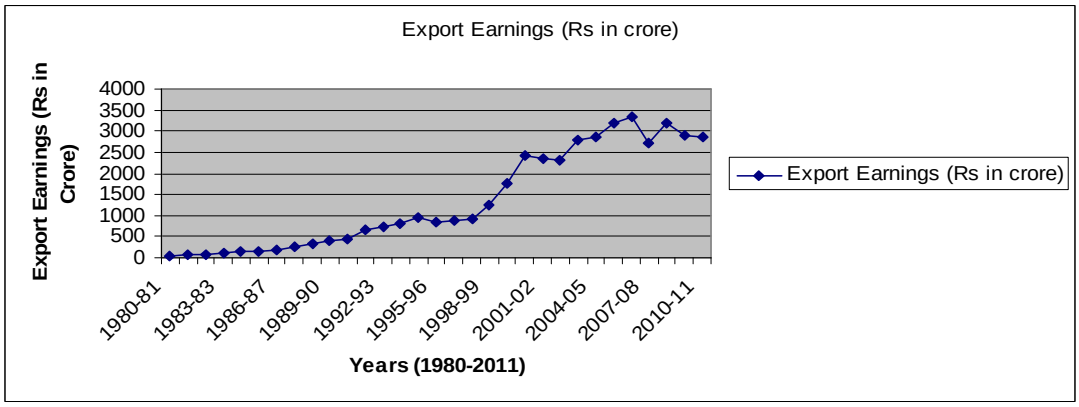
Poverty and marginalization in rural informal sectors like sericulture have started receiving increasing attention in the post-WTO regime in almost all silk producing developing economies when the continuous imposition of high-tariffs and specific duties and non-tariff barriers on the silk-textile exports made by these LDCs ultimately widened the inequality across the nations (Joseph, 2010). Jay Mazur (2000), President of Needle-trade, Industrial and Textile Employees stated that globalization has dramatically increased inequality between and within nations. However, debate among commentators kept burgeoning in the last few years whether inequality reduction and poverty reduction could be attained at a time. Artisanal silk industry, being vertically integrated, flows back greater share of its production

value to the farmer and artisanal sector (Sinha, 1989). Being rural, farm based and labour intensive, it has often been cited as an ideal example for initiating inclusive development in the annual reports of the Textile Ministry, Government of India (GOI, 2010-11,). According to Indian planners, sericulture provides assured income and employment to the rural people even in this phase of globalisation, catering the needs of those marginal and landless farmers and thereby playing a significant role in ensuring inclusive growth. The rural based farmers, entrepreneurs and artisans who cannot afford large investments but need higher returns for survival, actually belong to these ignored sections whose development is usually not taken into account in the process of globalisation. However, to sustain that process of development proper emphasis should be given on policy restructuring and making the domestic industry more competitive in this era of globalisation.

In 2000, a new textile policy was launched by the Government with the aim of modernizing the textile industry to meet global competitions and implementing it in a time bound manner with technological upgradation. The policy relaxed the restrictions on foreign investment, foreign technology and foreign equipment to make the domestic industry more competitive and efficient. Indian textile industries (which include silk industry) started integrating themselves with WTO since January, 2005. The bi-lateral quotas regulating global textile trade for many years in the name of MFA was phased out at the end of 2004 and ATC (Agreement on Textile and Clothing) took the place in quota eliminated regime. Porter (1994) analyzing the performance of garments sector in post-MFA regime presaged Indian exporters about China's edge on deriving scale edge and technology advantage over India. According to his prediction, only the best capable firms could reap the benefit out of this liberalized condition. In this section, we will compare the growth rates exhibited by Indian silk industry in both production and export sector in pre and post globalized periods and would observe whether globalisation has left any impact on the desired relation between growth of production and growth of export in silk sector. Our hypothesis regarding this is high production growth is imparting a higher export growth unless there is a strong demand bias within the domestic economy.

The noteworthy issue in this respect is that India's position in global silk trade was not up to the mark since the inception of the planning period despite possessing significant global production rank. This anomaly between production and exports have been reconciled by several researchers (Rajesh, 2011) elucidating mainly two common justifications. The first one explains that India is a big consumer of silk goods which drives the so called Indian silk-traders to cater to the need of domestic market instead of concentrating on foreign regions. Statistics evidenced that only 15% of India's raw silk product is exported (Samuel, 2000). The second justification states that Indian silk (raw silk and silk goods) fails to get access in foreign market due to low quality of multivoltine silk and poor brand-image. (Exim Bank, 2002; CSB - Online Annual Reports, Rajesh 2011, Naik and Babu, 1993). Commentators often try to justify the prevalence of multivoltine silk production and cross-breed variety cultivation is due to its easy technological access and assured return while bivoltine silk is not suitable for the climate of tropical regions of India. However, being highly qualitative, bivoltine silk attracts much higher price and creates larger demand in foreign market as well as in the domestic market where silk is being woven in powerlooms. This research section will test which justification is more pro-active with special reference to the period of post globalisation.

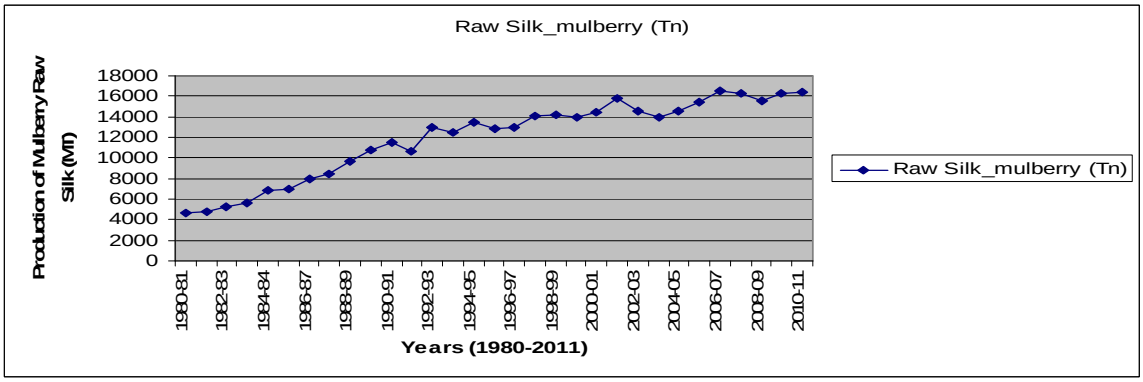
Fig 5.1: Trends in Export Earnings from Silk & Silk Goods (1980-2010)



Source : CSB

Pre-globalisation period includes the entire post Independence period before 1991 which started with a sluggish rate of growth in Indian Silk exports. At the end of the First Five Year Plan (1951-56), the mulberry silk production was 1098 tonnes while the certified exports in silk goods and silk wastes were Rs. 0.26 crores in each sector. After four decades or so, (i.e., at the end of the Seventh FYP), the mulberry raw-silk production touched the level of 10805 tonnes, while the exports reached Rs. 392.48 crores. Thus in the post-Independence and pre liberalized period (1951-1990) the production growth exhibits a compound annual growth rate of 6.96 %, while the exports earning shows a growth rate of 24%. This growth rate seems to be magnified in magnitude due to a very poor and sluggish rate of growth in exports in the initial period of planning. In the decade preceding the globalisation (i.e., 1980-1990) silk exports grew from Rs. 53.12 crore to Rs 440 crore of export earnings exhibiting an annual growth of 23.56% (see Table 5.1), while with the turn of the century it reached Rs 2422 crore and thereby reflecting 18.58% annual growth in the decade following the globalisation. This first decade of 21st century exhibits drastic deterioration in Indian silk export earnings growth with an annual average of 1.7%. Therefore if timeline data is observed, it would be noticed that growth of exports during these three successive decades displayed a consistently steep and declining trend, from 23.56 to 18.58 and then to 1.69 percent. Despite showing a rising trend in export volume, this decline in growth rate in Indian Silk Industry needs to be analysed with cautious foresight, which will be done in the following sections.

Fig 5.2: Trends in Production of Mulberry Raw Silk in India (1980-2010)



Comparing the annual growth rates between production of raw silk and export earning from silk goods in successive decades of pre and post globalisation, a reverse trend between

growth in production and that of exports has been observed. An annual growth rate in export earnings from silk goods is 23.56% in the pre-liberalized period, while that in production of mulberry raw silk is only 9.6%. The pre liberalization decade also exhibits a perfect correlation between production of raw silk and export earnings from raw silk, which has been estimated analysing the year wise data and measuring Kendall's and Spearman's rank correlation (See table 5.1).

Table 5.1: Annual Growth in Production of Raw Silk & Exports of Silk Goods in India

Time Period	CAGR in Export Earnings from Silk Goods (%)	CAGR in Production of Raw Silk (%)	Correlation (Export Earnings, Raw Silk Production)
1980-81 to1990-91 (Pre-Liberalization)	**23.56**	**9.60**	Kendall's r = 1.00** Spearman's r = 1.00**
1990-91 to 2000-01 (Post- Liberalization-I)	**18.58**	**2.31**	Kendall's r = .745** Spearman's r = .891**
2000-01 to 2010-11 (Post Liberalization-II)	**1.69**	**27.99**	Kendall r = .309 Spearman's r = .445

Author's Calculation based on the data available from CSB (1999, 2003, online)

On the other hand, the post liberalized decade shows the annual growth in export earning at the level of 18.58%, while that of production falls steeply to 2.3% per annum. But what is surprising is that even this decade of globalisation exhibits significantly positive correlation between export earnings from raw-silk and production of raw silk, though the degree of association has been loosened compared to that of the previous decade. The year 1995 in the first decade of globalisation is eventually significant due to formation of WTO, whose major objective was to promote multi-lateral trade irrespective of the status of development by reducing all kinds of trade distorting barriers. However, India's export growth in silk sector has diminished over this decade.

The initial decade of 21st century would be ideal for analyzing the far-reaching impact of liberalization which witnessed a depressing growth in export earning of silk goods (1.69%) while production growth is markedly substantial, i.e., 27.99%. Moreover, this decade evidences breakage of statistically significant bonding between production of raw silk and export earnings. Therefore acceleration in production rate failed to assure high growth in exports of silk and perhaps it has absorbed by the growing demand in the domestic market.
Market level studies indicate that demand for exportables in silk market depends on several quality-related factors and India has comparative inefficiency in this zone compared to that of China while penetrating the market of developed economies (Feng et al., 2009). However, the point which cannot be undermined at this juncture is that India's import volume of silk has also declined substantially during this decade. Quantity wise growth of imported raw silk in India was 77.7% in 1999-00, which fell to -14.4% in 2004-05 (Rajesh, 2011). From 9709 MT of silk and silk goods, the import volume has declined to the level of 5122 MT during 2012-13 (www.inserco.org/en/india). Therefore, it can be inferred that a major part of domestic production is actually utilized for import substitution.

5.2.1 China's WTO Membership & Its Impact on Indian Artisanal Silk Industry

Chinese silk occupies a special place in the world of textile since its discovery and People Republic of China dominates the global export market of raw silk, silk-yarn and silk fabrics since mid of 1980s with the fall in Japan's dominance both in production and export market[2].

In 1995, share of Chinese exports in global raw silk (SITC 2613) market was 85.74% (in value terms), which was followed by Germany (6.78%), Singapore (3.28%), Italy (1.27%) and India (0.40%). On the other hand, in global export basket of silk fabrics and fabrics of silk waste (SITC: 6541), China captured one third of the share (33.3%) which was followed by Italy (24.4%), Korea Republic (13.5%) and India (6.17%). During 1999-2000, the global trade share of Chinese raw-silk, silk yarn and fabrics were 93 percent, 43 percent and 29 percent of the global exports in respective category. In December 2001, China became the member of WTO and has agreed to undertake a series of commitments to open and liberalize its regime in order to better integrate with the world economy and offer a more predictable enforcement for trade and foreign investment in accordance with WTO rule.

The entry of China's membership in WTO posed opportunities and threats simultaneously to Indian artisanal silk industry. The perceived benefit for Indian silk industry as expected by the market analysts would be that China would be enforced to cut down its trade-distorting subsidies which would restrain the tendency to undercut export prices. Under the Subsidies and Countervailing Measures (SCM) of WTO agreement, China has to regularize these subsidies based on the standard production cost and other parameters. It would help in containing price fluctuations of silk yarn in the international as well as domestic market. However, the adverse impact of Chinese joining in WTO seems to be its fierce competition with the domestic market of Indian silk industry. India is the largest silk consumer in the world and therefore Chinese interest to penetrate and capture Indian market would be enormous and having comparative cost and quality advantage of producing raw silk and silk yarn, it could destroy the indigenous artisanal industry.

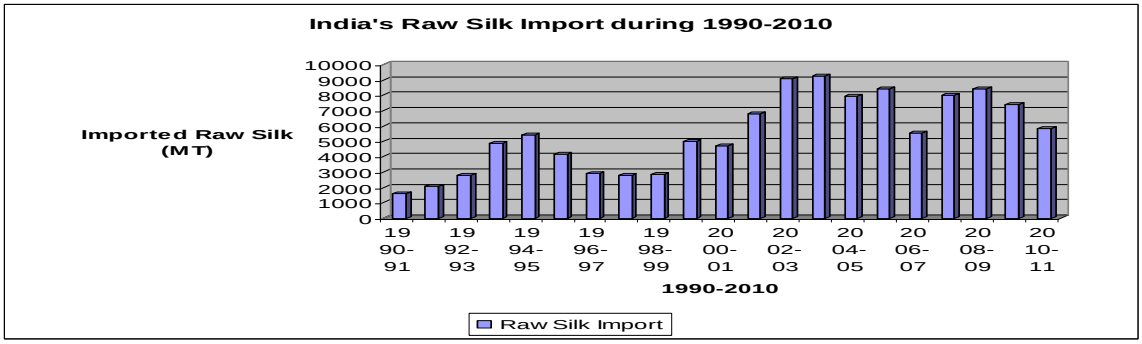
Intensity of price competition is already an issue which has been affecting Indian silk industry in initial decade of globalisation. Market researchers predicted that China could afford to sell raw silk at 40 percent lower than the Indian price (EXIM Bank, 2002). Another important aspect which pushes Central Silk Board to stimulate its cocoon productivity by 50 percent and reducing its renditta count to at least 8 is obviously regarding quality augmentation. This could only ensure higher income for the farmer-artisans attached with silk industry even in a situation of falling cocoon prices.

In the post WTO participation, China's aggressive market capturing policy has been explained as one of the major reasons for the dismal growth performance of Indian silk industry in export sector. During 2000-2005, export volume of Chinese cocoon silk and pure silk have risen from 87% to 90% and from 55% to 70% of the total world trading volume respectively. China started spreading its domestic sericulture from economically developed areas to less developed areas and began transforming the state-owned silk industry to private-owned silk farms (Feng et al., 2009). This helped China to stimulate its cocoon as well as raw-silk productivity and spread the benefits of development to non-traditional areas of the country, too. Thus China's WTO entry seems to ruin the prospects of Indian silk industry in the foreign market and necessarily compels the domestic traders to adopt an inward looking policy.

Artisanal silk industry is actually a vertically integrated industry where the value addition takes place in each successive stage. Mulberry cultivation and silkworm rearing stage rests at the lowest level, and then through feeding mulberry leaves to the silkworm and sexing and incubation, cocoon producing stage is reached. Then through piercing and cooking the cocoon in hot water and unraveling and procuring the filament and successively twisting and reeling, silk yarn can be produced in this stage. Thus the raw silk is obtained and processed to

remove the sericin[3]. This silk yarn is also imported from China, which is more quality and cost efficient compared to Indian silk yarn. This output affects all the down stream producers in the silk industry. This processed raw silk can again be woven to knit a variety of silk fabric.

Fig 5.3 Trends in Raw Silk Import during Post Liberalisation Periods in India



The growing import dependence of raw silk in India has been observed since wave of liberalization have taken place in Indian economy (see table 5.3). Earlier the support of the Chinese yarn was restricted to exporters against entitlements related to their actual export performance. Now, the consequence of free trade of Chinese yarn has made over 30% fall in domestic price. During 2000–01 to 2003–04, the import price of raw silk fell down from $24.50/Kg to $13.50/Kg. This made the rise in import volume in more than proportionate manner and the import elasticity of raw silk has been estimated at 2.14. This justifies the preference of domestic weavers for the Chinese yarn. In addition to that, the domestic powerloom weavers preferred it more due to better strength of the yarn.

On the other hand, country's handloom owners prefer it due to its cheaper variety. Thus, the demand was so intrinsic and acute that even when the exporters' genuine needs were met by earlier import license agreement, quantities of the Chinese yarn had continued to be smuggled through Nepal and Bangladesh. So, the Government of India found enough rationale to meet the excess gap of domestic production and industries demand and allowed free import of Chinese yarn on the premise that it would stop illegal trade.

Table 5.2 India's Import Elasticity of Raw Silk between 2000-2003

Year	Raw Silk Production (MT)	Import Price (US $/KG)	Import Elasticity of Raw Silk
2000-01	4713	24.50	2.14
2003-04	9258	13.50	

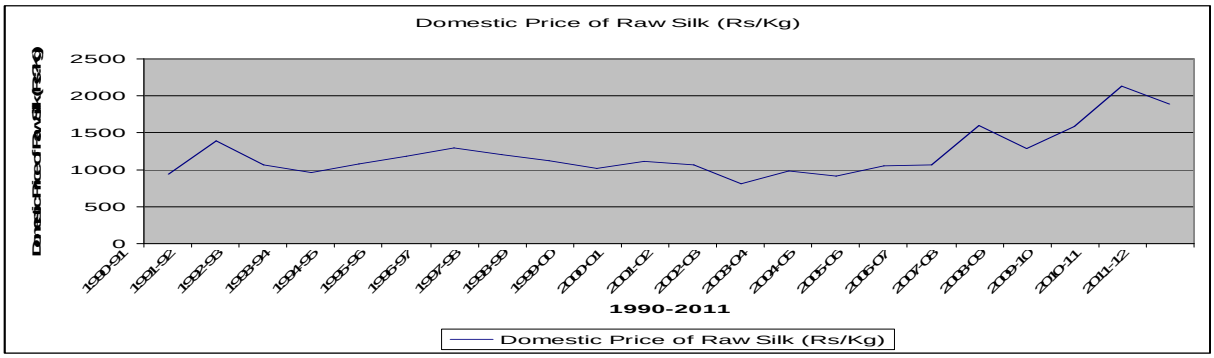
Source: CSB, Bangalore

Table 5.3 Import Affecting Sectors in Indian Silk Industry

Year	Domestic Raw silk Production (MT)	Import (as % of domestic production)	Positively affected sector		Negatively affected sector	
			No. of power-loom	No. of Handloom	Reeling Unit	Area under Mulberry cultivation
1999-2000	15214	39%	29340	227701	60838	215921
2004-2005	15445	75%	29340	258000	54846	17200

Source : COMPRADE, 2007 Ministry of Textiles, 2006.

Fig 5.4 Trends of Domestic Price of Raw Silk during 1990-2010



However, free import of Chinese yarn put a major blow to those sectors that are basically employment intensive and the worst hit section of people are rural women. Though the weavers (especially powerloom weavers) are assumed to be the beneficiaries of trade liberalization of raw silk, yet it is reflected in its statistical performance during 1999 to 2005, indicating stagnation in the sector. Domestic production increased only at 1.5 percent rate, which is much lower than its desired rate. Expansion has been observed only in the handloom sector to the tune of 13%. But the growing import dependence from 39% to 75% has made it clear how the Chinese yarn performed during the specified time period (see table 5.3). There was also a 10% closure of silk reeling unit in Indian artisanal sector while the area under mulberry cultivation was also reduced by 20%. Thus statistical analysis portrays a bleak situation of artisanal silk industry in the post trade liberalization periods.

China's accession in WTO was not predicted to cause any social disruption in the developing economies (Shafaeddin, 2002), but it actually disrupted the artisanal silk sector in Indian economy. Despite having lower hourly labour-cost, India could not reap the benefits of price competitiveness due to scale disadvantage compared to China. Moreover prevalence of the lower quality multivoltine silk spoilt its export potentials as well as demand for better quality silk in the domestic market. China's dumping of raw silk has been controlled with anti-dumping measures taken by the Government of India in 2003; this is the reason why domestic price of raw silk has shown an upward trend since 2003 (see fig 5.3). However, up to 2003, the openness of trade had adversely hurt the poor artisanal classes in Indian silk industry, including mulberry growers, silk worm rearers, silk-reelers. The multiplier effect of the loss of employment and income almost ensured destitution of these marginal artisanal classes. Further loss in employment/income of women can be converted into loss in nutrition intake of the respective families and consequent loss in health and education which can be treated as net social loss. Thus the entire social transformation which was hypothesized to rotate the wheel of development through promotion of artisanal silk industry from the lower strata of the economy (Sinha, 1989), faced a severe blow due to this liberalization policy.

The beneficiaries of this liberalization policy were only the weaving group, i.e., the relatively richer classes of powerloom weavers and few middle-men who often owned these powerlooms. Thus the impact of trade liberalization was pro-rich and the bias in turn created wider inequality. The transfer of wealth that was supposed to flow from rich urban section to the poor rural artisans no longer played its role. Thus the net impact of the import-liberalization is proved to be negative for the poverty stricken artisanal classes linked with the silk industry.

5.3 Impact of MFA Removal on Indian Artisanal Silk Industry

The textile industry across the world has gone through liberalization process as the stepwise phasing out of the Multi-Fiber Agreement (MFA) started in 1974 and concluded in 2004. In 1960, the first multilateral agreement governing the fiber industry trade, i.e., short and long term Cotton Agreement was negotiated under the GATT. Afterwards, MFA–I was introduced to control trade on new synthetic fiber products which was capturing the global market shares. The MFA was renewed five times. MFA was designed to regulate imports of textile products from one developing country to a developed country. MFA- IV (1986-91) extended the coverage to vegetable fibers (flax and ramie) and silk blends. The implication of this MFA was that USA and European Union used this clause mainly to protect their domestic textile industry from external competitions, i.e., competitions from the developing countries, like China, India, Bangladesh, Vietnam etc. However, as part of WTO negotiation, quantitative restriction of MFA has been dismantled in four phases and ultimately it has been completely abolished by the end of 2004. Therefore, in order to realize the impact of world-wide textile trade liberalization it is essential to study the impact in post-MFA period along with post globalisation trends beyond 1990 in India.

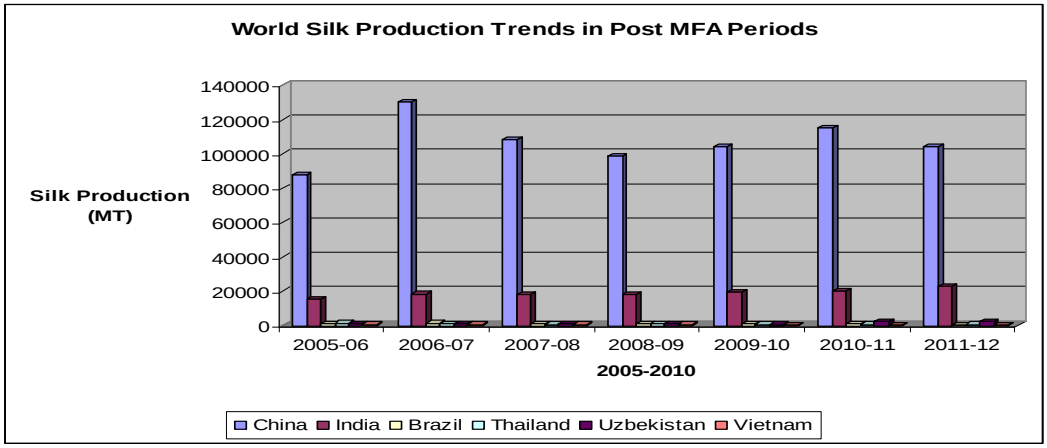
While for the textile sector, dismantling of MFA (on and from 2005) was expected to provide an opportunity to participate on a level playing field by developing economies, Indian silk Industry is yet to reap the benefit of free-trade. Despite enjoying natural geographical advantage and privileges of having abundunt cheap labour including household labour, and institutional support from CSB, ISEPC and State Governments, Indian silk Industry is yet to reap substantial benefits on the export front primarily because of its prevalent rudimentary technology (Doshi, 2009). In the post WTO period, the industry has also been adversely hit by environmental regulations and social controls (like, issues of child labour). Moreover, since India is also a leading consumer of silk goods, commentators and market researchers measured that almost 85% of the domestic production is used for domestic consumption (Samuel, 2000). Therefore, pressure of excessive domestic demand also outweighs the export orientation of the industry.

Umesh et al. (2009) have attempted to measure trade competitiveness of Silk Industry in response to WTO formation on the basis of the data available between 1984-85 and 2006-07 by calculating Nominal Protection Coefficient (i.e., Ratio between the domestic price to the international price of a comparable grade of a commodity, adjusted for all transfer costs, such as freight, insurance, handling costs, import duties, losses etc.). In the post WTO period, with the abolishment of exports restrictions, the nominal protection coefficient for silk goods has fallen, which explains vulnerability of the silk sector or lack of export competitiveness of this specific sector. Therefore, it can be inferred that Indian silk industry did not possess a competitive edge when MFA was fully eliminated and the trade giant China was ready to reap its benefit.

The year 2005 was also marked as the beginning of trade liberalized era in silk textile and India and China were two dominant producing nations followed by Thailand and Brazil and their respective production share was 80.2%, 14.1%, 1.3% and 1.2% (See Fig 5.5a). As a matter of fact, in 2005, the export share of silk and silk goods of China was 90.8 % while that of Brazil, Japan and India were 5.6%, 2.1% and 1.5% respectively (ISERCO, online). Thus the beginning of the MFA free phase started with Chinese domination in world market; while

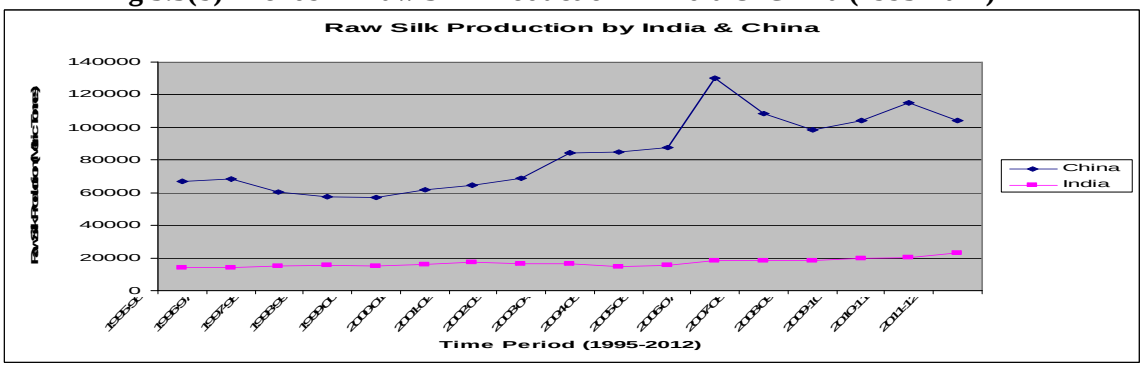
India's relative position in export market was hardly visible. This Chinese market capturing policy has been intensified during the post MFA phase and ultimately in 2010, India could export in a smaller share of the global market, i.e., 1.13 % of global export market while China captures a larger share, i.e., 94.4% of global market of raw silk exports. This proves how MFA elimination has been successfully utilized by China while India's relative situation in global market of silk and silk goods deteriorated.

Fig 5.5 (a) World Raw Silk Production in Post MFA Period (2005-2011)



Source: http://www.inserco.org/newsite (accessed on July 2012)

Fig 5.5(b) Trends in Raw Silk Production in India & China (1995-2011)



However, deteriorating situation in global trade does not necessarily imply destitution of the artisanal silk sector, especially in case of India where the domestic market is so vibrant that phasing out of MFA in turn poses a challenge to retain the domestic market by Indian silk industry. Table 5.4 shows the annual growth rate of mulberry silk production during Pre-MFA and Post MFA phases which elucidates that the silk sector in India is growing in the Post MFA phase though the success is not reflected in its export scenario.

Table 5.4 Annual Growth in Raw Silk Production during 1995-2011

Country	CAGR (1995-2004)	CAGR (2005-2011)
China	2.66	2.86
India	0.55	6.91
Japan	-24.35	-18.49
Brazil	-5.29	-12.98
Korea Republic	-100	-1.74
Uzbekistan	-100	17.09
Thailand	0.87	-12.1
Vietnam	not available	-5.04
Others	-100	-48.19
Total	**2.48**	**3.10**

Calculation based on data available from COMTRADE,2007; CSB (online); INSERCO (online)

Table 5.5 Global silk production and export share by India & China in Pre & Post MFA

	1999	2005	2010
India			
Global Silk Production Share	**19.3**	**14.11**	**17.5**
Global Silk Export Share	**4.48**	**1.52**	**1.13**
China			
Global Silk Production Share	**72.52**	**80.22**	**79.10**
Global Silk Exports Share	**76.3**	**90.8**	**94.37**

Source : Exim Bank(2002), CSB (online), ISERCO(online).

On the other hand, the global share of silk exports in China has exhibited a rising trend in exports throughout 1990-2010, while production growth shows certain ups and downs. Researchers believe that the increase in global share of Chinese exports justifies the cause of loss of India's ground in global market. As mentioned earlier, the hourly labour cost is marginally lower in India compared to China, but China excels by appropriating economies of scale. Fig 5.6 illustrates that MFA phasing out may not help China to augment its export volume in absolute terms, but its comparative cost advantage helps it to push out other rival countries from the global market and thereby raising its share in global export market.

Fig 5.6: Market Share of Silk Exporting Countries (1999-2011)

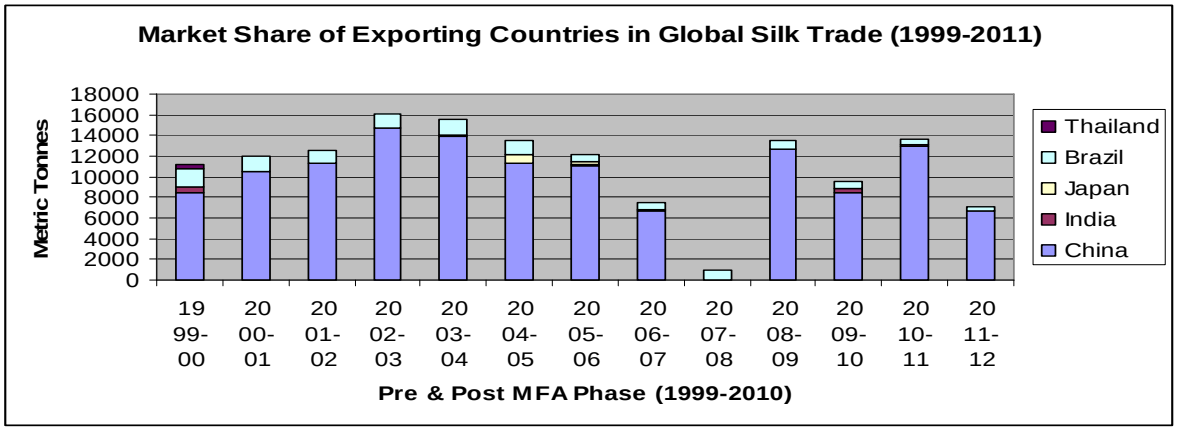


Table 5.6: Impact of MFA Abolition on the Indian Silk Industry

Year	Export Earning	Import Exp	Net Exp earning	Imp/Exp Ratio	Domestic Income	Domestic Wage (Monthly)
	Rs in Cr	Rs in Cr	Rs in Cr		Rs in Cr	Rs
1999-00	1755.55	490.16	1265.39	0.279206	1415.31	2645.45
2000-01	2421.98	574.46	1847.52	0.237186	1610.61	2982.613
2001-02	2359.56	820.25	1539.31	0.347628	1680.83	3056.066
2002-03	2294.05	859.94	1434.11	0.374857	1176.66	2101.194
2003-04	2779.19	1035.27	1743.92	0.372508	1374.64	2433.005
2004-05	2879.56	1187.1	1692.46	0.41225	1337.73	2306.431
Pre-MFA Average			**1587.118**	**0.337273**	**1432.63**	**2587.46**

2005-06	3194.2	1581.53	1612.67	0.495126	1624.81	2730.78
2006-07	3338.35	1366.25	1972.1	0.409259	1754.95	2923.46
2007-08	2727.87	1597.11	1130.76	0.585479	1666.73	2723.43
2008-09	3178.19	1749.58	1428.61	0.550496	2005.88	3178.89
2009-10	2892.44	1839.25	1053.19	0.635882	2578.87	3783.01
2010-11	2863.76	1749.1	1114.66	0.61077	3476.50	4795.17
Post –MFA Average			**1385.332**	**0.547835**	**2184.63**	**3355.79**

Source: CSB (2003, online)

Analyzing the trends of India's export earning from silk and silk goods and import expenditure during the six preceding and succeeding years of MFA removal, it is observed that the average net annual export earning from the sector has experienced a decline from Rs 1587 crore to Rs. 1385 crore (See Table 5.6). This could be attributed to partial withdrawal of Indian silk Industry from the foreign market due to stiff price competition from Chinese Silk. Goswami (2009) opined that the total business volume of China throughout the globe was much higher than India, even before the phasing out of MFA. Removal of MFA just helped China to expand and utilize its cost and quality advantage in major destinations. Quality parameter is a major issue which ultimately determines the volume of trade in international trade of silk and silk goods. India's multivoltine silk is inferior to bivoltine silk of China in terms of length of reeling yarn as well as of the strength of the yarn, thus producing much more breakages. This quality edge helped China to capture the foreign market relatively easily. As a matter of fact, USA and India remained the two major destinations of Chinese silk industry for long. China's major destination of silk goods was USA, while India was a major market of Chinese export of silk fabrics and raw silk (Goswami, 2009).

India relied extensively on imported high quality raw silk to further develop silk fabrics for the export market. That is why consistent increase in raw-silk import to Indian market has been observed. According to Anitha (2009) this is mainly due to inadequacy of supply flow within the domestic sector. It is estimated that against the domestic demand of around 26,000 tonnes per annum in the immediately succeeding year of removal of MFA (i.e., 2005-06), the domestic production was only 17300 tonnes. Besides, high quality mulberry raw silk is not being produced in the country to the extent as it is demanded. This is basically reflection of demand posed by powerloom industry for export purpose and also to some extent in the handloom industry for using as wrap[4] in textile weaving (Anita, 2009). This inevitably leads to rise in import expenditure as evidenced from the rise in average import/export ratio during this period. The average Import-Export ratio has increased from 0.34 to 0.55 from pre MFA to post MFA period. The average domestic annual income generation from Indian sericulture had risen from Rs. 1432.63 crores to Rs. 2184.63crores during this period of MFA abolition. The average monthly wage of the artisanal sericulturists in India during the pre-MFA phase was estimated at Rs. 2587.46, which increased to an average of Rs. 3355.79 during the post globalisation period. The data corroboration leads us to conclude that MFA abolition may raise the import dependence of Indian Silk Industry, but the sericulture farmers and artisans have been benefited from the rise in average monthly wage (computed on the basis of income and employment generation in sericulture at national level). Thus situation of artisanal sector fared well in the post MFA period though the development is not trade-driven during this period. The next section will make a comparative study of the development perceived by the artisanal silk sectors and the non-artisanal class of the same industry during the period of trade liberalization since the formation of WTO.

5.4 Impact of WTO Formation & MFA Removal in both Artisanal & Non-Artisanal Sectors of Indian Silk Industry

This section will unfold the relation between trade liberalization (WTO formation & MFA removal) and associated development in both artisanal and non-artisanal classes in Indian silk industry. The reference time frame chosen for this study is from the formation of WTO till 2011, due to availability of statistical data over these periods. This section will address several issues like, whether the export earnings in the silk production is actually causing any pro-poor development in the post-MFA phase (2005-2010); whether the income generation of sericulture peasants and artisan class is growing at least at the same rate as the growth in export earnings (which is income of the topmost non-artisanal classes of this vertical integrated industry). The chosen sub-periods of this analysis are (i) 1995-96 to 2000-01; (ii) 2000-01 to 2005-06 ; (iii) 2005-06 to 2010-11; The first period would exhibit immediate impact of WTO formation; the second period would signify the situation of silk industry in pre-MFA (Multi Fiber Agreement) period as well as impact of China's accession to WTO (i.e., in 2001) and the third period will connote the quota withdrawal impact in post-MFA period. Multi Fiber Agreement, as noted earlier, was actually a global quota agreement on textiles and garments that regulated international trade during 1974-2004 by imposing quantitative restrain on developing countries which would export textiles and garments to developed nations. At GATT Uruguay Round, it was decided that MFA would be gradually dismantled and it finally expired on 1 January, 2005. However, in Post MFA the most dangerous consequence anticipated by the market analysts is Chinese aggressive policies of capturing foreign markets.

Table 5.7 Comparison of Annual Growth Rates between Export Earnings & Per Capita Domestic Earnings of Silk Artisans

Period	CAGR in Per Capita Income of Silk Artisans	CAGR in Export Earnings
1995-96 to 2000-01 (Post WTO period)	1.60	23.4
2000-01 to 2005-06 (China's Entry to WTO & Pre MFA period)	-1.75	5.69
2005-06 to 2010-11 (Post MFA period)	11.92	-2.16

Author's Calculation

The negative growth of India's artisanal income in silk industry after China's accession to WTO (i.e., 2001 onwards) can be explained by the huge inflow of Chinese raw silk and yarn in domestic market of India which eroded income earning capacities of many domestic household based silk farms. The low price and better quality silk pushed back many artisans into sheer destitutions. Farmer-rearers and reelers are worst affected due to this glut of Chinese raw silk and moreover from 2000-01 to 2002-03, the price of raw silk experienced a drastic reduction from US$ 24.50 per Kg in May 2001 to US$ 13.50 per Kg in June, 2003. It occupied in such a way that poor quality silk started entering into India's market at a cheaper rate and many traders cum producers (i.e., non-artisanal sections of the silk industry) mixed the poor quality of silk fibres and tried to sell them as best quality silk. Surprisingly, many powerloom units in Karnataka shut down, though the weaving sections were expected to reap the benefit of cheap raw silk prices (Vasumathi, 2000). This presumably indicates that reeling industry was incapable of buffering against this price

shock due to their fragmented size. Thus a mixed impact was created on non-artisanal sections of the silk industry due to Chinese dumping of silk in the domestic market.

To correct that situation, Indian Government imposed anti-dumping duty on raw silk and set a price of US$27.98 per Kg for Chinese imports of mulberry raw silk of 2A grade and below with effect from July, 2003. Sections of weavers cum merchants pleaded for removing this anti-dumping duty, as inflow of cheaper quality raw silk favoured their production. There existed 30,000 powerlooms and 180,000 handlooms in India using pure silk yarn in manufacturing silk fabrics and employing jointly more than one million workers. Their jobs were at stake with this imposition of anti dumping notification (DGAD, 2003). Thus there was a growing debate between the parties attached with silk industry whether anti-dumping imposition is conducive to the development of artisanal silk industry. However, the Chinese silk exporters shortly changed their market strategy and started exporting large quantities of silk fabrics to India. The import of Chinese fabric increased from 3208 MT to 3597 MT during 2003-04 to 2004-05. But according to Dr. S.B. Dandin, Director of the Central Sericultural Research & Training Institute, Chinese exporters started injecting 2A variety as 3A variety and escaped from anti-dumping levies and again Indian market was being captured by Chinese silk ruining the prospect of rearing and reeling sections of Indian silk sector (Khan, 2004). Twisted silk was also flowing in, which was beyond the purview of anti-dumping notifications (Ministry of Textile GOI, 2003). Thus the anti dumping duty and its retaliatory impact continued to leave its impact on Indian artisanal silk sector.

Meanwhile, the Government of India also adopted a gamut of policies apart from levying anti-dumping duty on Chinese imports into India. The Government of India has initiated several programs to revamp its export horizon in silk sector, which includes production of quality raw silk, viz., implementation of Catalytic Development Programme (CDP) for popularization of improved technologies evolved by Research Institutes. It was expected to enhance the production of raw silk through vertical and horizontal expansion of sericulture especially mulberry bivoltine silk besides creating greater opportunities for gainful employment in rural and backward areas. To improve productivity and quality at all levels of production processes starting from leaf production to fabrics, the Government tried to make some efforts which includes evolving of new bivoltine breeds with assistance from Japan International Co-operation Agency (JICA), development of new varieties of mulberry plants with higher yields, development of improved devices, new machines & equipments. The Central Silk Board attempted to import and popularized the automatic silk reeling machines for improvement of the quality of silk yarn and introduced motorized silk reeling/spinning machines. It also set up common facility centers and established Silk Conditioning and Testing Houses. In addition to these, a separate Project named “Quality Certification System for Silk” to ensure quality maintenance at different levels of production process (silkworm seed, cocoon and raw silk production) was initiated. As a part of this project, a scheme “Silk Mark” was launched through the Silk Mark Organization of India (SMOI) under Central Silk Board for the products made from pure natural silk and guarantees the purity of silk products. It also plays an important role in brand promotion of Indian silk in domestic and export markets. Other important measures taken by the Government of India include improving research and development and the effective transfer of technology at all stages, encouraging clustering of activities of reeling & weaving and strengthening of linkages between the producers in order to ensure improvement in silk productivity and quality.

However, despite formulating these series of policy restructuring, Indian Government failed to rejuvenate its export intensity in silk sector. Table 5.7 adequately substantiates the above. In the post MFA period the export of Indian silk goods shows a declining growth trend. This could be further analyzed with Chinese export penetration level in the same developed market where India usually exports its silk goods. However, the positive aspect is that the large section of the poor peasants and artisans who are involved with the sericulture are experiencing rising growth in their per capita income due to stimulation in domestic production at a commendable rate. Table 5.1 revealed strong correlation between export earnings from silk goods and production of raw silk in the phases of pre-liberalization period (1980-1990) and even in the following decade of globalisation (1990-2000). However, the first decade of 21st century fails to come up with any such conclusive relation between production and trade. Nonetheless, table 5.7 enables us to compare the rate of growth between export earnings and silk artisans' per capita income, which establishes an inverse relation in the post globalization period. This further reinforces the point that the development impact experienced by the artisanal sector of the silk industry in the post-globalisation period is not trade driven. Despite so many odds, the Central Government, in its 12th Plan (2012-2016) document, has again proposed a target of producing 32000 MT of bivoltine silk with special focus on producing internationally graded bivoltine silk so that trade driven growth can ameliorate the situations of silk artisans in near future.

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5.5 Regional Equality & Trade Openness in Indian Silk Sector

Regional equality is an indicator of distributive development which enhances the aggregate level of welfare across the states. Indian economy through-out its planning horizon endeavoured to reduce this inequalities in order to promote balanced regional development though very little perceptible change has been observed in reality. Artisanal silk industry is also not an exception. This section will throw some light over the issues whether trade openness and globalisation of silk industry have reduced the level of regional inequality in silk production and more specifically their contribution to export sector. There are several ways of computing this regional inequality with trade openness as proposed by the researchers. Barua and Chakraborty (2010) attempted to estimate the relationship between inter-regional inequality and trade openness in case of India and found that regional inequality in India has been increasing in all sectors of income except the primary sector. In agriculture, rising inequality in agricultural growth across Indian states significantly increased income inequality in India and increasing trend in equality has been observed with increase in openness of the country.

Naranpanawa and Arora (2012) identified the regional impact of trade liberalization with a general equilibrium framework for Indian economy. Their results suggest that trade-liberalization produces beneficial impact for rich and fast growing middle income states while it leaves marginal or negative impact for the poor states in the short run. Gaur (2010) examined inter-state disparities in India during 1980-2001and their study reveals rising trends of inequality across Indian states since reforms in 1991. Kanbur (2010) also argued that inter-state disparities have increased widely in post-reform period particularly in the rural and urban areas. Marjit et al.(2007) propose a Regional Trade Openness Index (RTOI) based on the comparison between production proportion of the state and the export /import share of them in India. A composite index was developed by taking the arithmetic mean of export and import rank of the states. It was found that states with relatively high level of income are also those with greater contribution to trade and such a relation has grown stronger over time.

In this research study, explicit export and import share of silk producing and consuming states are not available, therefore following Marjit's proposition (ibid, 2007), production /income generation rank of states are taken as proxy variables of their corresponding exposure in trade share. The research question which would drive the analysis in this section includes whether trade liberalization is raising the regional inequality during (i) pre and post decades of globalisation and (ii) pre & post phases of MFA Abolition. For calculating Regional Inequality, Herfindahl Index (alternatively known as Herfindahl-Hirschman Concentration Index) will be used which will measure how the production structure is concentrated on an individual state instead of being diversified across other traditional silk producing states. Concentration Index is also a mark of Regional Inequality. Following Margit's (2007) proposition greater regional equality or lesser concentration can help all the states to have greater exposure to trade as well as internationalization.

The present section tests the trends in production concentration of the silk industry against internationalization as well as openness of the sector. If the rising openness or internationalization is lowering the concentration of production structure of the silk industry one can say that trade liberalization is bringing about regional equality across the states. 'Trade Openness' & 'Internationalization of Industry' and "Herfindahl-Hirschman Concentration Index' have been adopted as indicators for illustration purpose, which can be defined as following:

Openness of Silk Industry = [Volume of Trade in Silk / Domestic Income generation from Silk Production] * 100

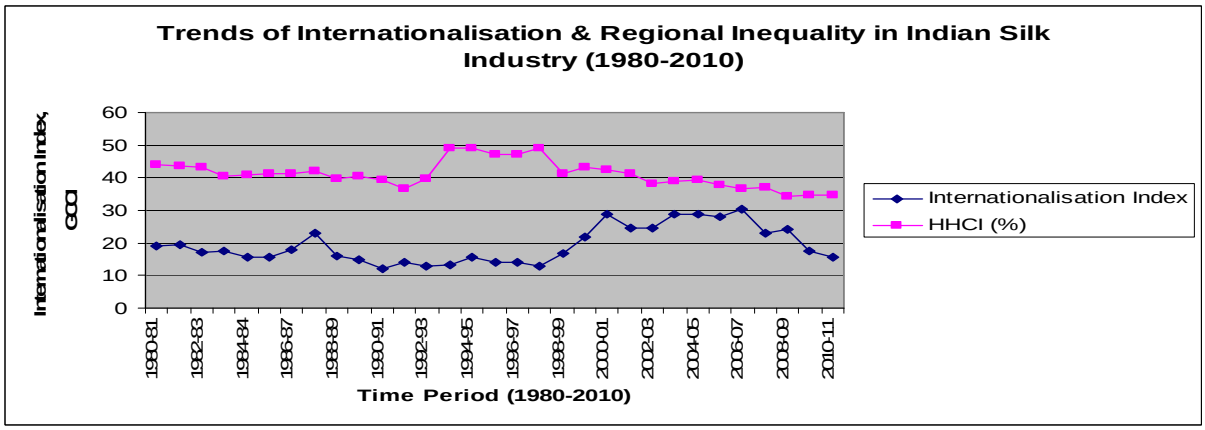
Internationalization of Silk Industry = [Export Earning/ Domestic Income generation from Silk Production] * 100

Herfindahl-Hirschman Concentration Index (HHCI) = $\left[\sum_{=1}^{ni} (x_i/X)^2\right] * 100$

When HHCI is greater than 18%, the production structure will be said to have a concentrated structure and that marks high regional inequality. If the value of HHCI lies between 10% and 18%, the production structure will be said to have a moderate concentration, resulting in moderate regional inequality. If HHCI is lower than 10% then the production structure will be said to have a moderate regional equality, while production structure is said to have a high regional equality if the HHCI is lower than 1%.

Constructed Herfindahl-Hirschman Concentration Index of Indian Silk Industry, during 1980-2010, reveal that Indian Silk Industry was suffering from high degrees of industrial concentration which reflects its high degrees of regional inequality. Globalisation in the decade of 1990s has raised the level of regional inequality of silk industry (see Fig 5.7) as the values of index have risen to the level of 50%. The value of HHCI has declined only in the last decade (2000-2010) though high degrees of regional inequality remained the persistent feature of the industry. The objective of this section is to analyze this regional inequality at the backdrop of internationalization of the silk industry during the reference period of the study, i.e., 1980-2010. Trends of internationalization help to capture the capacity of the industry to get access to the foreign market. In the post globalization period the internationalization of the industry failed to exhibit any positive trends till 1998-99. From 1999 onwards the trends reflect acceleration in capturing global silk market till 2005, after which it shows a downward sloping trend. The regional concentration of production structure also projects a declining trend till 1997. Therefore from diagrammatic exposition, one can infer that rise in internationalization and fall in regional inequality (or regional concentration) is occurring simultaneously.

Fig 5.7 Trends in Internationalization & HHCI in Indian Silk Industry (1980-2010)



However, a statistical operation on these two parameters 'internationalization index' and 'HHCI' fail to reveal any statistically significant correlation though the sign of the correlation has been found to be negative. However, in another deviating attempt of analyzing the association between 'export earning from silk sector & HHCI of Indian silk industry' and 'import expenditure & HHCI of Indian Silk Industry', it has been found to be statistically significant and an inverse relationship between the two sets of parameters. This degree of association becomes stronger in the post globalisation period.

Therefore we can conclude that though the Indian silk industry fails to project even any moderate regional equality till 2010, the trade parameters are helping to reduce its degree of regional concentration to a significant extent (see table 5.8). The export parameters has been found more significantly associated with regional inequality index than import parameter and the degree of association has been intensified during the post globalisation period implying decline in regional inequality is actually improving export prospect of the silk industry more intensively in the later period. As the exports of silk goods are also import intensive, the import expenditure is also rising with the rise in the level of exports.

Table 5.8 Correlation between Regional Concentration & Trade Parameters

	Herfindahl-Hirschman Concentration Index (HHCI)	
Trade Parameters	Kendall's tau Rank Correlation	Spearman's Rank Correlation
Internationalization Index (1980-2010)	-0.204	-0.310
Internationalization Index (1990-2010)	-0.248	-0.382
Export Earning (1980-2010)	-0.372**	-0.517**
Export Earning (1990-2010)	-0.429**	-0.603**
Import Expenditure (1980-2010)	-0.273*	-0.446**
Import Expenditure (1990-2010)	-0.286	-0.484*

Author's Calculation

5.5.1 State Based Regional Inequality in Pre & Post MFA Periods

In the post MFA period, the competition across the textile exporting developing nations gets enhanced due to opening up of the developed market for the developing nations. Against this back drop, the change in regional inequality in spreading production of the Indian silk-textile industry needs to be studied. Internationalization index fails to capture the impact of the import volume with the change in time horizon. Therefore it would be pertinent to capture that impact through 'trade-openness' indicator which jointly captures both the export and import share in the total trade volume. Trade Openness Index of the silk industry will be studied in this section for the pre and post MFA period.

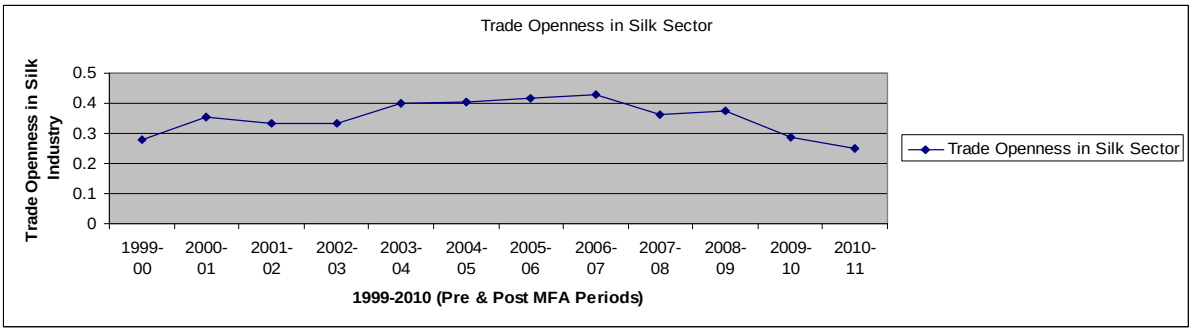
For measuring Regional Inequality at state level and for making a comparative study across the states during the reference period of study (1999-2010), another indicator of Regional Indicator is hereby proposed, as suggested by Institute of Manpower of Planning & Research, GoI (2002) and Roy (2013) where the state parameter in production is deflated by the national average to determine the degrees of Inequality.

Regional Inequality Index (RII) = (State Parameter /National Average Parameter)

RII of any state closer to 1(one) implies Regional Equality in the spread of silk industry. On the other hand states with fractional RII imply 'deprived states,' while RII with values greater than 1 signifies 'privileged states'. Policies promoting regional equality can bring two regionally unequal states into 'states with equity' and thereby RII = 1 will hold good.

Trade Openness during 1990-2010 has shown a mixed trend. In the pre-MFA abolition period (1999-2005), trade openness of silk industry has risen from 0.28 to 0.41. This signifies the long run impact of globalisation in Indian Silk Industry. On the other hand, during the post MFA period (2005-2010), the openness of the silk industry has again narrowed down from 0.41 level to 0.25 (see fig 5.8). This explains the immediate impact of MFA abolition. This can be better explained by Chinese aggressive foreign trade policy and comparative inefficiency of Indian sector in those markets.

Fig 5.8 Trade Openness in Indian Silk Industry (1999-2010)



Trade openness during 1999-2010 has shown an anomalous expansion but the regional inequality across the states during this pre and post MFA period has shown a consistently reducing trend. Karnataka and Andhra Pradesh remained the privileged states in silk industry so far as the regional disparity level is concerned, while the deprived states are West Bengal, Andhra Pradesh and Jammu & Kashmir. However, the regional inequalities between the states have been narrowed down in a very lacklustre manner. Besides trade parameters, presumably there exists a group of parameters viz., state-based initiatives, geographical advantages, socio-economic characteristics which may streamline the production level diversity across the regional states.

Table 5.9: Traditional Silk Producing State-based Regional Inequality Index & Trade Openness during 1999-2010

		Regional Inequality Index in Production				
Year	Trade Openness	Karnataka	Andhra Pradesh	Tamil Nadu	West Bengal	J&K
1999-00	0.279743	2.945017	1.362614	0.243726	0.417815	0.030828
2000-01	0.355451	2.878809	1.468544	0.249614	0.368628	0.034405
2001-02	0.331739	2.78939	1.526047	0.209332	0.449664	0.025567
2002-03	0.335282	2.342505	1.950586	0.169797	0.50246	0.034652
2003-04	0.398345	2.151381	2.189353	0.103067	0.525459	0.030739
2004-05	0.405738	2.528568	1.76051	0.153404	0.526352	0.031166
2005-06	0.41755	2.452403	1.764378	0.242581	0.509454	0.031184
2006-07	0.427887	2.427929	1.701983	0.346495	0.492177	0.031416
2007-08	0.364064	2.597894	1.414024	0.431616	0.523362	0.033104
2008-09	0.376054	2.404332	1.492161	0.468708	0.600917	0.033883
2009-10	0.287398	2.345892	1.631606	0.393001	0.594441	0.035061
2010-11	0.247922	2.339028	1.645098	0.376769	0.600854	0.038251

Source: Author's Calculation

5.6 Conclusions

Various impacts of globalisation of Indian silk industry have been studied in the preceding sections. The objective of this chapter was to delve into the issues of several dimensions of distributive development reached to the artisanal sericulture sector in response to the opening of the domestic economy as well as of the foreign developed economies with the quota abolition under MFA. It has been observed during the post globalisation periods that annual growth rate in silk export earning has been diminishing at a faster rate, though domestic production of raw silk followed a fluctuating growth path. The immediate post decade of globalisation exhibited a fall in growth of domestic raw silk production mainly due to huge inflow of Chinese raw silk through the opened gate of economy. China also very tactfully utilized the situation by dumping its product to capture vast Indian market. However, as dumping regulations were imposed due to major hue and cry arose from the rearing and reeling sections, the government of India imposed its anti-dumping landing fees to Chinese raw silk of Grade 2A or lower which is considered to be high quality silk. This helped to make a spurt in domestic production of raw silk to a greater extent. But the long standing statistically significant between domestic production and export was broken during the preceding decade of globalisation, i.e., 2001-2010. This decade experienced miserable decline in export growth rate with high production rate. On the other hand, the import of raw silk has continued projecting a steady upward trend implying growing market potentials of India. Imported silk of higher quality is largely demanded by the powerloom sectors of the weaving sections in artisanal silk industry. But the persistent growth in import has dwindled rearing and reeling artisans of the silk industry, which is evidenced through reduction in mulberry areas in post globalisation period and shutting down of reeling units, like charka, cottage basin and multi-end reeling machine. Withdrawal of quota regime from the developed country under MFA abolition could not cure Indian economy's balance of trade in silk and silk goods. China through its technological innovations ran much ahead pushing out India from the foreign markets. Silk merchant in India has chosen to make an inward looking

approach by concentrating their production within the domestic territory under the protection of anti-dumping regulations. The qualitative bivoltine silk production is still confined within few regions though enormous emphasis and ambitious target has been set forth in XII plan, too. At present, Tamil Nadu is the most prominent state producing bivoltine silk followed by Karnataka and Jammu & Kashmir, while West Bengal fails to add any substantive value in this export quality silk basket. West Bengal has also been identified as deprived state in analysing the regional inequality. Unless these regional inequalities are shortened and trade-policies are streamlined, no major break through in Indian artisanal silk industry is possible. In the upcoming chapter, the discussion will be centred on the problems and prospects of artisans in the silk industry.

End Notes

1. TRYSEM stands for Tribal Rural Youth Scheme for Self Employment, launched by Government of India in 1978 and aimed at providing basic technical and entrepreneurial skill to the rural poor in the age group of 18-35 years.
2. For details see 'Indian Silk Industry: A Sector Study', Occasional Paper No.90, Exim Bakk of India, Quest Publication, March 2002.
3. Sericin is the protein created by Bombyx mori in production of silk. It is actually the gum coating fibers which allow them to stick together.
4. 'Wrap' is the set of lengthwise strong yarns which are held in tension on a frame or loom , while weaving clothes.
5. See Human Rights Watch, Broken People: Caste Violence Against India's "Untouchables" (New York: Human Rights Watch, 1999), http://www.hrw.org/reports/1999/india/; Human Rights Watch, "Caste Discrimination: A Global Concern," A Human Rights Short Watch Report, vol. 13, no. 3(g), August 2001, http://www.hrw.org/reports/2001/globalcaste/caste0801-03.htm#P292_53595; Human Rights Watch,Contemporary Forms of Slavery in Pakistan (New York: Human Rights Watch, 1995), http://www.hrw.org/reports/1995/Pakistan.htm.
6. See Roy, C and Barman, J (2012): Child Labour & Inclusive Education in Backward Districts of India, International Journal of Education, Vol4, No.4. p 311-327.

CHAPTER: 6

Problems & Performance of Artisanal Silk Industry in West Bengal

6.1 Introduction

Last chapter explained the impact of regional concentration of silk-farms on the growing internationalisation of silk industry in India. It is observed that presently, West Bengal has been ranked third according to its production status after Karnataka and Andhra Pradesh and moreover the state is deprived so far as its regional inequality index is concerned. In other words, West Bengal has been labeled as 'deprived state' due to its successively lower production of raw silk compared to the national average, which is supposed to be an outcome of discriminatory regional policies in artisanal silk sector. Several commentators opined that despite bearing a golden legacy, the rudimentary technology of silk manufacturing sector was actually responsible for its tardy progress and that kept its status at a barely low level compared to its potentials. This chapter would at length make an analysis of these issues highlighting its present performance and challenges faced by the several stakeholders in the value chain of the artisanal silk industry of West Bengal.

Sericulture in West Bengal failed to develop evenly across all the districts of the state since its historical origin. Malda, Murshidabad and Birbhum were the three districts where prosperity of this sector had been prominently visible as early as eighteenth century. In 2001-02, the shares of mulberry raw silk production of these three districts were 71.5%, 13.3% and 11.6% respectively (CSB, 2003). Flourishing of mulberry sericulture in these districts hinged upon the nature of soil, climatic conditions and presence of sericulture farmers and artisans in those regions. Malda had a long association with silk production since 19th century and production of raw silk was one of the major auxiliary activities of this region. Presently, Malda produces 75% of the state's production and 6% of the national production and thereby occupying a pivotal role in production of mulberry raw silk in West Bengal. Murshidabad is rather famous for silk weaving as it bears a 350 years old indigenous silk industry's inheritance (Chaudhuri, 1977). On the other hand, Birbhum was originally a manufacturer of silk piece goods. In the 17th and early 18th centuries, the silk-articles, produced in Birbhum, had a good market outside Bengal. They were patronized by the Moughal Court (Gupta, 1980). The exports of Bengal silk manufacturers to England increased rapidly after the assumption of Dewani in 1765 (Mukhopadhyay, 1995) and Kassimbazar became the principal hub of this silk trading (Mukherjee, 1994).

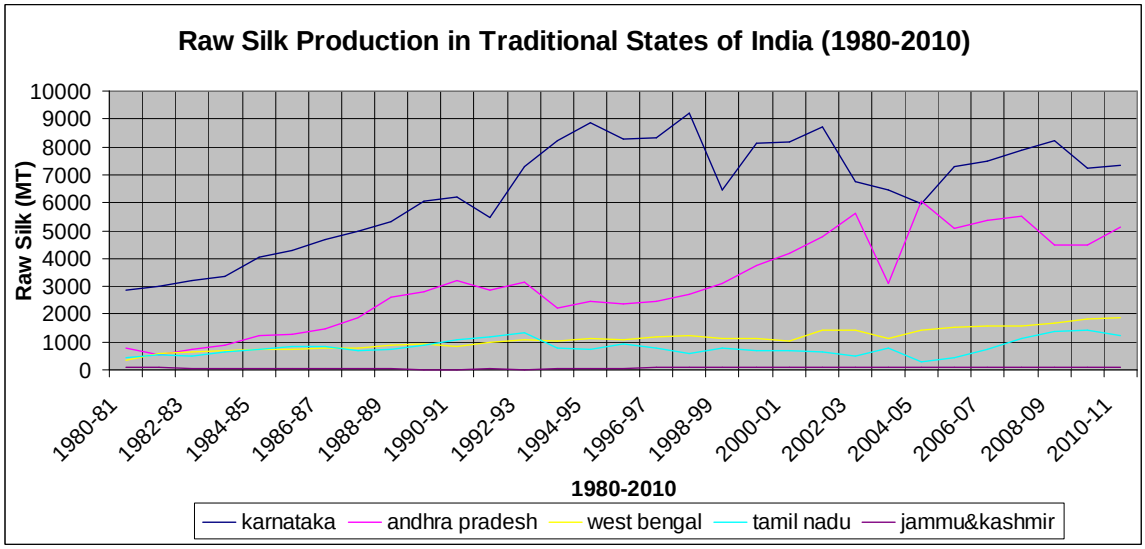
The major objective of this chapter is to delineate several issues faced by various stakeholders at different segments of the value chain in this vertically integrated industry of West Bengal at the backdrop of its growth trajectory. Our discussion will be initiated with a comparative analysis of the traditional states with respect to their productivity parameters. Section 6.3 will make an in depth analysis on artisanal silk sector of West Bengal covering certain pertinent issues, like income enhancement and employment generation during the plan period. The subsequent subsections will elaborate the supply chain of the industry and difficulties faced by silk-farmers, rearers and reelers at various stages of production, purchasing and selling in West Bengal. 6.4 will conclude the chapter stating the major findings and critical gaps in institutional measures taken so far.

6.2 Comparative Performance of Traditional Silk Producing States

As it has been indicated earlier that sericulture is traditionally being practiced in four major states of India, namely Karnataka, Andhra Pradesh, West Bengal and Tamil Nadu, excluding Jammu & Kashmir. Karnataka is the largest raw silk producing state in India, followed by Andhra Pradesh, West Bengal and Tamil Nadu. While West Bengal is the third largest silk

producing state in the country, Karnataka vests largest amount of land for sericulture followed by Andhra Pradesh, West Bengal and Tamil Nadu. Jammu & Kashmir is the bottom ranker and produces a minuscule part of mulberry compared to the rest. Fig 6.1 illustrates the growth trends of mulberry raw silk in all these five traditional states.

Fig 6.1 Raw Silk Production in Traditional Silk Producing States of India (1980-2010)



Source: CSB (1999, 2003, online)

Karnataka remains the largest silk producing state in India and the pre-globalisation decade witnessed its substantial growth compared to other traditional silk producing states which also have natural advantage in mulberry silk production. Andhra Pradesh remains the second largest producer of mulberry raw silk leaving Tamil Nadu and West Bengal lagging behind. However, the growth rate of West Bengal was higher in the pre-globalisation decade which helped to improve its rank than Tamil Nadu in the successive decades. Jammu & Kashmir despite having the climatic advantage of producing quality bivoltine mulberry silk, exhibited negative growth rate in the pre globalized era. The post globalization era marks opening up of gates for foreign silk producing countries, like China, Korea to take the advantage of market economy at much lower rate of entry barriers. This immediately lowered the price of raw silk and the domestic production was hampered as the rural farmer-artisans found it difficult to survive and started changing their vocation from sericulture to other income generating activities. During this decade of globalisation almost all traditional states experienced much lower rate of growth barring Jammu & Kashmir. In Tamil Nadu, the growth rate was negative which indicates that artisans have changed their livelihood which was reflected through decline in production of raw silk. The latest decade portrays a comparatively better picture which presumably is a reflection of imposition of anti-dumping barriers against Chinese imports in 2003. This helped to control the downswing of the mulberry raw-silk prices and provided some edge to artisans of several silk producing states. However, the growth rate experienced by the largest silk producing state remains lowest in this decade which may be due to reaching of saturation point of the state. In post globalisation phase, Karnataka was largely reorienting its production from multivoltine to bivoltine mulberry silk production. The negative growth rate is possibly the result due to that transitional phase. Tamil Nadu is presently the largest bivoltine silk producing state and it exhibits substantial growth rate in the initial decade of 21st century. West Bengal, which is only producing multivoltine silk, Nitsari, being the most popular variety, experienced largest rate of growth track in the last

decade. Thus post globalisation antidumping measure seems to have been most beneficial to the artisanal silk industry of West Bengal.

Table 6.1 Annual Growth Rates in Raw Silk Production by Traditional States in India

Year	Karnataka	Andhra Pradesh	West Bengal	Tamil Nadu	Jammu & Kashmir
1980-90	7.84	13.34	10.06	6.33	-10.89
1990-00	2.71	1.64	3.35	-4.56	16.79
2000-10	-1.07	2.04	6.03	5.66	1.16

Author's Calculation on the basis of the data available in CSB (1999, 2003, online)

The comprehensive data for interstate productivity comparisons is available up to 2002-03. Considering 2001-02 as the bench mark of the beginning of the initial decade of 21st century, a comparative study on land-based productivity across the traditional states, will be made here. In 2001, Karnataka vested 116,158 hectares of land for sericulture and produced 8728 metric tons of raw silk, while Andhra Pradesh, West Bengal and Tamil Nadu cultivated mulberry on 52,225hctares, 18,794hectares and 13,096 hectares area of land and produced 4775mt, 1407mt and 655mt of raw silk, respectively. Jammu & Kashmir produces only bivoltine silk and its production range is much lower compared to the rest of the traditional states and therefore it has been excluded from the comparative productivity analysis. Analyzing time series data, existence of a positive correlation between area of mulberry cultivation (major food for the silk worm) and volume of raw silk production has been found as a whole for India. However, the degrees of variation differ from state to state. For Karnataka, a significant correlation (at .05 level) is observed between area of cultivation and volume of silk production and Spearman's rank correlation coefficient is found to be 0.480. On the other hand, in case of Andhra Pradesh, the significant Pearson's correlation coefficient is 0.486 while Spearman's Rank correlation coefficient is 0.66. For the third largest silk producing state, viz. West Bengal, the degree of association between the area of cultivation and volume of raw silk production found is even higher than the previous two states: i.e., Pearson's correlation coefficient is 0.709, while Spearman's rank correlation coefficient is 0.799; While for Tamil Nadu the similar correlation is also significant, i.e., Pearson's correlation coefficient is 0.692, while the Spearman's rank correlation coefficient is 0.598. This implies area extension in mulberry activities is helping in production escalation. These findings worked as an eye opener about the superior position of the state of West Bengal on the basis of land productivity and therefore draw attention of this study. The rest of the section will make some analytical studies on this direction.

Table 6.2 State Level Association between Cultivation Area & Silk Production

States	Pearson's Correlation Coefficient (Area of Cultivation, Silk Production)	Spearman's Rank Correlation Coefficient (Area of Cultivation, Silk Production)
Karnataka	0.480*	Insignificant
Andhra Pradesh	0.486*	0.66*
West Bengal	**0.709***	**0.799***
Tamil Nadu	0.692*	0.598*

* significant at 0.05 level

6.2.1 Karnataka versus West Bengal

The state wise comparative analysis between area of mulberry cultivation and amount of silk production reveals that for a state like Karnataka, the area of production is not that much important for raising its volume of production like that of West Bengal (See table 6.2). This indirectly indicates that land area is not necessarily connected with silk production in Karnataka as that in West Bengal. Annual Report of 2010-11 has shown that silk production throughout the country followed a steady growth over the years despite drastic reduction in mulberry cultivation area due to various constraints, like droughts in Karnataka and Adhra Pradesh, labour scarcity, urbanization, steep fall in cocoon prices etc (GOI, 2010-11). This increase in silk production is therefore due to improvement in productivity leading to vertical growth of the industry, due to research and development intervention and implementation of various technology-absorbing development programs, like Catalytic Development Program and so on.

However, this section will make a comparative analysis of averages of raw silk production and land-based productivity (land productivity) between Karnataka and West Bengal on the basis of the available statistics during the period 1980-2002. Two random numbers have been chosen to identify these states, viz., Karnataka =1 and West Bengal = 4 and the available data help us to obtain the statistical results (see table 6.3) which show that the average land productivity of West Bengal remained much higher than that of Karnataka throughout the period. In Karnataka sericulture is being practiced in 19207 villages while 2339 villages of West Bengal are involved with this livelihood. Thus, spatial concentration of this livelihood is higher in West Bengal which helps to monitor and implement different types of programs. Average number of families attached with sericulture per village is also higher in West Bengal (48.9) than Karnataka (13.22). Moreover, sericulture has almost reached a point of saturation in Karnataka while expansion is still possible in West Bengal. These could be the reasons which may justify why West Bengal exhibits higher land productivity in silk production compared to the largest silk producing state Karnataka.

Production of raw silk and involvement of sericultural families with this particular livelihood also depend upon a large range of factors including alternative employment opportunities, relative returns from this activities, climatic factors and productivity of labour, productivity of land. By productivity of land here it is implied that the volume of raw silk produced by the artisans after feeding the mulberry leaves (to the silkworm) grown in one hectare of land. Silk is extracted from the cocoon of silk-worm which eats this mulberry leaf as its food. Karnataka is the largest silk producing state in India and, therefore, silk productivity (kg/ha) can be compared in order to compare the degree of potential employment generating capacities in these two states, though there exists a host of productivity parameters, like reeling cocoon productivity (kg/ha and kg/100dfls), renditta count etc., which play crucial role in output and employment generation.

Table-6.3, containing descriptive statistics for Karnataka and West Bengal, actually shows that the average land based silk productivity is higher in West Bengal (57.92kg/ha) than Karnataka (44.94kg/ha) and Karnataka's performance also witnesses greater variation than West Bengal. The second panel table of 6.3, on the other hand, gives the result of the comparative analysis of the land-based productivity in these two states. It shows the results of two tests: Levene's test for Equality of Variances and t-test for Equality of Means. A higher value of significance (0.06 > 0.05) associated with the Levene's Test tells us that two groups having equal variances and, therefore, null hypothesis of equal variances is true.

Hence, the statistic associated with the assumption of ‘equal variances’ needs be used for the t-test for Equality of Means.

Table 6.3 Group Statistics and Independent Sample Test (Karnataka and West Bengal)

	State	N	Mean	Std. Deviation	Std. Error Mean
Productivity	1	22	44.94	16.39	3.49
	4	22	57.92	14.49	3.09

	Levene's test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	T	d.f	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Equal variances assumed	3.730	.060	– 2.782	42	.008	– 12.97	4.66
Equal variances not assumed			– 2.782	41	.008	– 12.97	4.66

The t-test result shows – 2.782 with 42 degrees of freedom. The corresponding two-tailed p-value is 0.008, which is less than 0.01. Therefore, we can reject the null hypothesis at 1% level of significance, which means that the average productivity of these two states significantly differs. However, we are interested in knowing whether lower land productivity in Karnataka than that of West Bengal is statistically significant. Then the null hypothesis would be as following and we need the p-value of one-tailed test.

The one-tailed significant value or p-value can be obtained by dividing the two-tailed value by 2.Thus the one-tailed p-value in this case would be 0.004 , which is less than 0.01. Therefore, we reject the null hypothesis even at 1% level of significance and conclude that average raw silk productivity (land-wise) in Karnataka is significantly lower than that of West Bengal during 1980-2002.

6.2.2 Andhra Pradesh versus West Bengal

Similar type of exercise will be done, here, with the second largest silk producing state, i.e., Andhra Pradesh vis-à-vis West Bengal. Here we label Andhra Pradesh as ‘2’ and West Bengal as ‘4’ for analytical convenience and the available statistics regarding the two states during the time period 1980-2002 helped us to compare the means of their land-based productivity in raw silk.

Table 6.4 shows that the average per hectare productivity of raw silk is marginally greater in West Bengal than in Andhra Pradesh, while the variations are lower in former than the latter. This is presumably because of the reason that Andhra Pradesh extends the opportunity to 115 thousand sericulture families living in 8082 villages to get involved with this livelihood while in West Bengal 114 thousand sericultural families are living in 2339 villages and practicing sericulture (CSB, 2003). Thus spatial concentration of artisanal silk sector is much lower in West Bengal than that in Andhra Pradesh, which raises its land productivity and lowers its variation. The Levene’s test tells us that two states have unequal variances as the level of

significance associated with F statistic is less than 0.01 and therefore the null hypothesis of equal variances is rejected. The t-test result (associated with equal variances not assumed) shows p-value 0.394 which is higher than 0.05, this means that the null hypothesis of equality of means is accepted. Therefore, so far as land wise productivity is concerned we cannot claim any substantial level of difference between the average productivities (land-wise) between Andhra Pradesh and West Bengal.

Table 6.4 Group Statistics and Independent Sample Test (Andhra Pradesh and West Bengal)

	State	N	Mean	Std. Deviation	Std. Error Mean
PRODVTY	2	22	52.60	24.97	5.32
	4	22	57.92	14.49	3.09

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	d.f	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
PRODVTY	Equal variances assumed	15.926	.000	– 0.863	42	0.393	– 5.31	6.16	– 17.74	7.11
	Equal variances not assumed			– 0.863	34	0.394	– 0.5.31	6.16	– 17.83	7.20

6.2.3 Tamil Nadu versus West Bengal

Tamil Nadu is another traditional state where sericulture is being practiced, though production-wise its rank is lower than West Bengal. We intend to make a comparative analysis and instead of repeating the same statistical exercise, a different level of comparison will be attempted between West Bengal and Tamil Nadu. Table 6.5 describes that there is a substantial level of productivity difference between West Bengal and Tamil Nadu on the basis of the time series data available for the period 1980-2002.

Table 6.5 Group Statistics between Tamil Nadu and West Bengal

	State	N	Mean	Std. Deviation	Std. Error Mean
PRODTVTY	3	22	41.01	19.13	4.08
	4	22	57.92	14.49	3.09

However, this comparative level of efficiency with respect to acreage productivity alone cannot portray the whole situation. If the annual productivity between the year 2002-2003 and 2012-2013 is taken into account, Tamil Nadu would show much deterioration in productivity level compared to India (see table 6.6). It is because 48.6 percent of Tamil Nadu's silk comprises of bivoltine variety while West Bengal produces very negligible proportion of bivoltine silk. Bivoltine silk is sold in premium price and possesses superior

quality and therefore acreage productivity comparison can not be a measure of yardstick between multivoltine silk and bivoltine silk. Tamil Nadu has the largest number of handloom units in the country. Presently 80,000 handlooms units are producing sarees and dhoties. Weaving centres are quite strong in Tamil Nadu and Kancheepuram, Arni, Kumbakonam, Tanjore, Salem, Madurai and Coimbatore produce international quality silk sarees and dhoties under private as well as co-operative initiatives. On the other hand despite having inbuilt potentials, silk weaving sector is not so organized and streamlined in West Bengal. In 2011-12, the state possesses only 7768 handlooms comprising all types of silk. Silkworm rearing and mulberry cultivation are carried on throughout the regions of Malda and Murshidabad, while prominent reeling centres in these districts are Mothabari, Madhurghat, Malda, Rampurhat, Berhampur and Chawk-Islampur. Most of the reelers in West Bengal depend upon the southern states of UP and Bihar, Benaras and Bhagalpur for the disposal of their processed silk yarn. Murshidabad, Bankura, Birbhum and Nadia have weaving sectors but the level of production is not parallel to that of Tamil Nadu.

Therefore, we can conclude that per hectare silk productivity of West Bengal is greater than Karnataka (the largest silk producing state) and almost equivalent to Andhra Pradesh, though similar level of comparison is not possible with the silk producing states like Tamil Nadu and Jammu & Kashmir. Jammu & Kashmir produces only bivoltine silk while Tamil Nadu produces a substantial volume which restricts the scope to make similar level productivity comparisons. But incidentally it can be said that low production rank in raw silk of West Bengal cannot be attributed to the low productivity of land. High acreage productivity of mulberry silk can be attributed to the technological innovations and transfer of technological know-how directly to the field and because of the spatial concentration of artisanal silk industry in West Bengal. However, this analysis is restricted to the comprehensive data availability during 1980-2001, due to non-availability of continuous updated time-series data for later years. On the otherhand, depending on the projected data as provided by CSB (2013) a modest attempt of comparison between two time-periods (ie., 2002-03 and 2012-13) will make this analysis worth illustrating. It will also give an idea of the impact of modernization and far reaching effect of globalisation at disaggregated level.

Table 6.6 Comparative Growth of Silk Productivity in Traditional States during 2002-03 to 2012-13^{P}

Traditional States	Mulberry Area (ha)		Raw Silk(MT)		Productivity (Kg/ha)	
	2002-03	2012-13^{P}	2002-03	2012-13^{P}	2002-03	2012-13^{P}
Karnataka	88930	74730	6760	8219	76.04	109.98
Andhra Pradesh	54384	43165	5629	6550	103.5	151.74
Tamil Nadu	5394	16656	490	1185	90.84	71.15
West Bengal	**12569**	**13775**	**1450**	**2002**	**115.36**	**145.34**
J&K	5986	7557	100	141	16.71	18.66
India	194463	192126	14617	18755	75.15	97.62

Source : CSB (2003), CSB (updated o 30.5.2013); P = projected

Table 6.6 provides an opportunity to compare the growth pattern of artisanal silk industry and its land productivity for 2002-03 and 2012-13. It shows mulberry area cultivation in Karnataka and Andhra Pradesh have reduced drastically possibly due to drought in these areas (CSB-Annual Report, 2012-13), as explained by the market researchers. But since land productivity is raised, higher level of output generation becomes possible. However, incase of West Bengal, both output and productivity was raised which reflects the progress of the

artisanal silk industry in West Bengal. At national level, the average productivity of land has shown a rising trend from 75.15 kg/ha to 97.62kg/ha. Experts opined that the major reasons behind the increase in acreage productivity is adoption of high leaf yielding mulberry varieties, improved silkworm hybrids and better technologies in silkworm rearing and reeling (CSB, 2013).

The growth in acreage productivity during 2002-03 and projected 2012-13 reveals that almost all the traditional states enjoyed this productivity growth except Tamil Nadu. Land cultivated for silk production during these ten years have increased significantly in Tamil Nadu leaving no impressionable impact on raw silk production. Orienting silk towards bivoltine breeds could be one plausible justification behind this but Jammu & Kashmir which is solely producing bivoltine silk exhibits greater productivity than that. While the boon of technological innovation is helping to stimulate acreage productivity in almost all the states, Tamil Nadu cannot be a sole exception from the rest. Therefore dynamism of artisanal silk industry in Tamil Nadu should be reviewed with caution which is beyond the scope of this research study. In the upcoming section, the discussion will be centred on the focal issues, i.e., artisanal silk industry in West Bengal.

6.3 Artisanal Silk Industry in West Bengal

This section will make a modest attempt to elucidate the growth and development of artisanal silk industry in the West Bengal in post independence period. 6.3.1 will explain the progress of the industry in West Bengal during planning periods, while 6.3.2 will make a brief district level analysis. The next sub section 6.3.2 will illustrate the supply chain of the silk production in West Bengal and the subsequent section will illustrate the problems faced by different stakeholders in the value chain in the process of production of artisanal silk.

6.3.1 Progress of West Bengal's Artisanal Silk Industry during Plan Periods

In the post independence period, sericulture and silk industry in West Bengal set out its desired course of progressive development through various catalytic projects over the planning periods. It gradually became an important rural vocation in the state providing employment and livelihood to a large number of families pre-dominantly dwelling in rural and semi urban areas. However, sericulture didn't find a separate place in the First Five Year Plan (1951-52 to 1955-56). The central assistance was made available to the state under the broad scheme of "other village industries". Against Rs.7.21 lakh allocated, the utilization was only Rs. 2.37lakh and 4912 hectare of land was brought under mulberry cultivation which resulted into 382 MT of raw silk production and 114,000 employment generation. After the establishment of the Central Silk Board in 1948, regional development offices were established in silk producing states for supervising sericulture development across the regions. Calcutta (presently known as Kolkata) was considered as the gateway of the entire eastern and north-eastern India and therefore to cater to the demand of various sericulture establishments, this regional development office came into existence in the early 1950s.

From the second Five Year Plan (1956-57 to 1960-61) onwards, sericulture received a new emphasis in India as separate allocation of fund under Central and State sericulture department was approved by the Planning Commission. Since then several development programs were taken up. Against allocation of Rs 62 lakh for the state, only 37 percent was utilized in this plan period. Incidentally, West Bengal had been producing all four commercially exploited varieties of silk since the inception of the planning period. Out of the

four varieties mulberry, *eri*, *tasar* and *muga*, the first two silkworm breeds are domestically reared, while *tasar* and *muga* are wild and reared on trees. Each of these silkworm species feeds on leaves of specific food plants. Of these four varieties, mulberry silk yields maximum share and generates maximum level of employment. Mulberry sericulture is also practiced throughout the state of West Bengal excepting Howrah and East Medinipur district.

During The Third Plan (1961-66), Rs. 79 lakh was allocated for West Bengal and only 40 percent was utilized. Central Sericulture Research Institute at Berhampore was reorganized during this period. This is the oldest premier research institute in West Bengal established in 1943 mainly to restore the decaying trends of sericulture due to outbreak of silkworm diseases. Gradually, the Institute modified its objectives. However, developing technologies to improve mulberry leaf productivity in more eco-friendly and cost efficient way remained its major objectives. Central Silk Board always works in close tandem with this Research Institute along with National Silkworm Seed Organization to implement an array of developmental project encompassing sericulture. Another major objective of the Research Institute was to evolve region and season specific high yielding silkworm breeds. Updated technological knowledge is being disseminated by the institute's extension network program. It has been observed that the excessively diversified climate remained a serious bottleneck for sustainable development of sericulture in West Bengal.

The Fourth Five Year plan (1969-74) reflected a comparatively higher utilization of allocated funds, i.e., 81%. But the production of raw silk at the end of this planning period showed a declining trend. Mulberry cultivation also evidenced a declining trend. However, bivoltine rearing was introduced for the first time during this planning period. During the Fifth Five Year Plan (1974-79), the Planning Commission allocated Rs. 3375lakh for West Bengal and Rs. 481 lakh was spent during this phase. Area of mulberry cultivation was also raised significantly and the state was further strengthened through establishment of grainages by CSB. These grainages were expected to supply quality bivoltine and multivoltine silkworm seeds to the sericulture farmers. The immense potentiality of sericulture in reconstructing the rural economy of West Bengal was distinctly felt and that necessitated creation of a separate Directorate, i.e., Directorate of Textile (Sericulture) at West Bengal in 1975. The Directorate of Textile identified long legacy of silkworm rearing with impeccable skill and expertise of silk rearers as one of the major strengths of sericulture in West Bengal. Mulberry leaf productivity was also higher than the national average because of the fertile Gangetic alluvial soil.

During the Sixth Five Year Plan (1980-85) the Planning Commission approved 10.5% of the gross budget for West Bengal. Area of mulberry cultivation under this plan had shown a stupendous growth of 53% which translated into 59.3% growth in production of raw silk and employment growth rate in this sector was also 95%. The Regional office of Central Silk Board was bifurcated in 1982 with the creation of Regional Development office at Malda. The technical wing was shifted to Malda from CSB, Calcutta office. The Calcutta office became certificate issuing authority to the exporters of silk and silk goods.

Again during the Seventh Five Year Plan (1985-1990), the growth in mulberry cultivation and raw silk exhibited a diminishing trend, while 71 per cent of the allocated fund was spent. During this plan period, the Central Silk Board implemented an Intensive Sericulture Development Project in West Bengal at a total outlay of Rs. 967 lakh. The project envisaged expansion of area under mulberry cultivation by 4000 acres besides developing infrastructure for encouraging the systematic seed production, and, supply and marketing cocoons. During

the terminal year of the Seventh Plan, National Sericulture Project was introduced in West Bengal by Central Silk Board with financial assistance of the World Bank and SDC. The project was launched over a period of seven years for the development of mulberry sericulture in the state with a credit line from IDA and SDC.

The Eighth Five Year Plan (1992-97) experienced growth in the area of mulberry acreage, raw silk production and employment generation at the rates of 32%, 25%, 32% respectively. 61% of the allocated funds were utilized in this plan – a fall of 20% in two decades. Again, ninth plan (1997-2002) witnessed a fall in the area of mulberry cultivation in the tune of -12.9% but rise in growth of mulberry production (i.e., 21.5%) and marginal rise in the level of employment (0.9%). Several schemes under Centrally Development Project were implemented under this plan to boost the performance of this sector. The project was launched to confer the amenities of using economic oven, drying chambers, construction of rearing houses, rearing appliances etc. 'Seri-2000' was initiated to induce the sericulture farmers and artisans to use the new technology. A cluster of initiatives undertaken during this period aimed at improving rearing houses for mulberry farmers. The major objectives of the project included replacing local variety of mulberry with HYV mulberry - the loss to the farmers in the process to be compensated, promotion of post cocoon sector (reeling & twisting) through technology upgradation, supply of machineries, implements and planting material and training of officials, farmers and artisans.

Table 6.7 Progress of Sericulture during planning period in West Bengal

End of Plan Period	**Allocation (Rs. in Lakh)**	**Expenditure (Rs in Lakh)**	**Mulberry Cultivation Area (ha)** (cumulative)	**Raw Silk Production**	**Employment Generation** (Lakh Person) (cumulative)
First Plan (1955-56)	7.21	2.37	4912	382	1.14
Second Plan (1960-61)	62.0	23.26	6070	543	1.43
Third Plan (1965-66)	79.0	31.86	6490	685	1.48
Fourth Plan (1973-74)	64.0	52.0	5733	563	1.40
Fifth Plan (1977-78)	375.0	481.1	8093	450	1.60
Sixth Plan (1984-85)	1433.25	710.0	12401	717	2.45
Seventh Plan(89-90)	1587.26	1127.08	16337	926	3.23
Eighth Plan (1996-97)	5195.0	3168.74	21575	1158	4.27
Ninth Plan (1998-99)	1284.06	1391.41	21817	1118	4.31
Tenth Plan (2001-02)	na	na	19013	1407	Na
Eleventh Plan (2010-11)	na	na	13138	1885	Na

Source: Market Research Wing, Textile Committee, Mumbai

During the first decade of the new millennium (2001-2010) sericulture sector in West Bengal experienced certain distinguished modification. The first year of the Tenth Plan (i.e., 2002-2003) witnessed increase in production of mulberry silk by 3.1% (1450MT) compared to its performance in the previous year 2001-2002 (1407MT). However, there was a sharp decline in the areas of mulberry cultivation during that period. In 2001-02 the area of mulberry cultivation was 18794ha. It was reduced to 12569ha in 2002-03 which in other way also indicated its rise in productivity. In 2002, approximately 1.1 lakh sericulture families were involved with production of raw silk. By the end of the Eleventh Five Year Plan (precisely in 2011) the involvement of sericulture families has shown certain degrees of contraction, i.e., 0.92 lakh. This no doubt indicates that sericulture fails to provide expected stable returns to the farmers compared to alternative cultivable food grains or other cash crops. However, raw silk production has shown a substantial degree of improvement from 1407 MT to 1885MT during this 2002-2011. Despite the fall in acreage and number of involvement of sericulture families, this augmentation actually reveals technological induction and its implementation in rural sericulture.

Table 6.8 Status of Sericulture in West Bengal

Parameters	As on 31.3.2002	As on 31.3.2011
Plantation (Acres)	46983	32467
No. of Farmers	110,000	92,200
Silk Production	1407	1885
A. Infrastructure provided by the Government		
Farms	62	62
Grainages	16	16
Cold Storage	4	4
Technical Service Centre	59	59
Cocoon Market	12	12
Filature	2	2
Twisting Plant	2	2
Reeling Training Centre	5	5
Sericulture Training Institute	2	2
B. Infrastructure at Private Level		
1. Reeling Unit a) Cottage Basin	4158	2987
b) Ghosh Basin	NA	4755
c) Charka	3193	322
2. Drying Chamber	100	110
3.Powerloom	138	128
4. Handloom	28621	19045
5. Weavers	122000	27260

Source : Govt of Textile (sericulture)

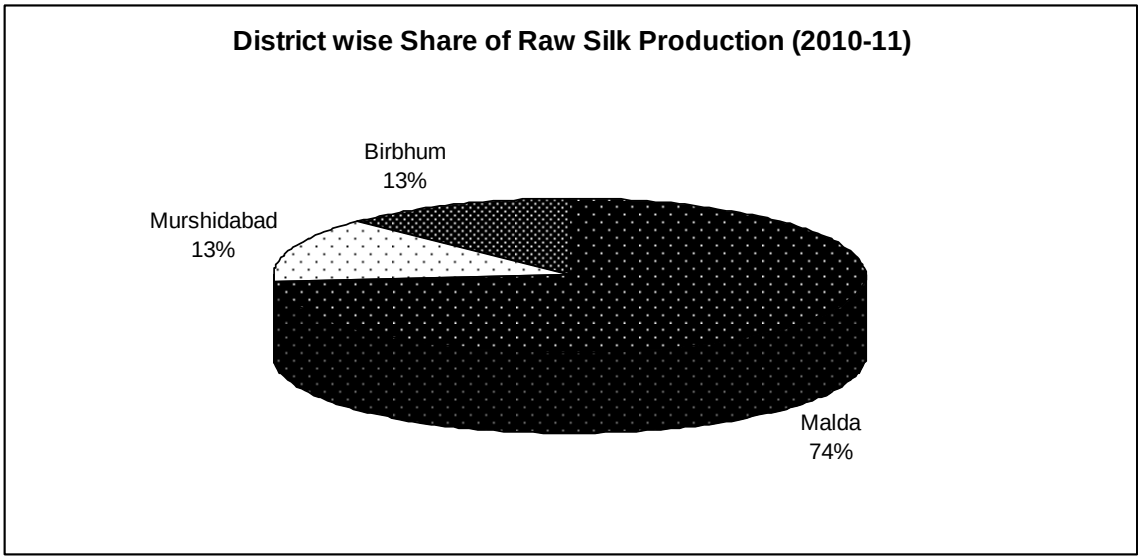
So far as infrastructural amenities are concerned, artisanal silk industry in West Bengal remained static during 2002-2011 (see table 6.8). At present, there are 62 basic seed farms, 16 egg production centers, (grainages), and 59 technical service centers throughout the state. Starting from the number of farms, grainages, cold storage, technical service centre, to filature, twisting plant, reeling training centre and sericulture training institute no dynamism has been observed in institutional infrastructure level during 2002-2011. At private

infrastructure level, the result is even more depressing. Numbers of reeling units have declined both in cottage basin and country charka units. Powerlooms have been reduced from 138 unit to 128 unit and so did the number of handlooms during 2002-2011. Despite this worsening level of infrastructure, number of weavers connected with silk production has been raised from 1.2 lakh to 2.7 lakh during this phase (Department of Sericulture, Government of West Bengal, 2002, 2011). Directorate of Textile (sericulture) in their online information indicated that during 2011 to 2013, the mulberry area increased from 32467 acres to 35227 acres and the corresponding raw-silk production was also stimulated from 1885 to 2018 Metric Tones. The employment generation during this phase increased from 259,736 to 281816. According to BAE&S (online), Raw Silk production was raised from 1790MT to 2689MT during 2010-2011, while employment generation was raised from 247480 to 264942 persons. Despite some data discrepancies due to different sources of origin, both the statistics actually reveal a growing trend of artisanal silk industry in West Bengal over the recent past.

6.3.2 District Level Analysis in West Bengal

As we have noted earlier, Malda, Murshidabad and Birbhum are the only three traditional silk producing districts where raw silk production takes place in substantial way compared to other districts of West Bengal (See fig 6.2). Malda produced 1389.56MT of raw silk (73.7% of state production) in 2010-11. From 2001-02 to 2010-11, this production showed a compound annual growth rate of 0.03 percent. Area of mulberry cultivation has increased from 335.27 acre to 366.68 acres, showing a growth rate of a meager 0.01 percent. However the additional employment generation capacity was reduced from 4065 persons to 3093 persons over this period of nine years.

Fig 6.2 Raw Silk Production (District wise share) in West Bengal, 2010-11



Murshidabad is the second highest raw silk producing district in West Bengal producing around 15percent of the state production. Murshidabad is rather famous for silk woven sarees (namely Murshidabad silk). So far as the three parameters, i.e., mulberry area coverage, production of raw silk and employment generation are concerned, the performance of the district is not similar to Malda. From 2001-02 to 2009-10, the mulberry area had declined from 280.62 acre to 270.69 acre, while production of mulberry raw silk has shown a matching declining trend from 190 MT to 95MT. Even in the case of additional employment generation it shows a diminishing trend from 3513 persons to 2166 persons during this phase.

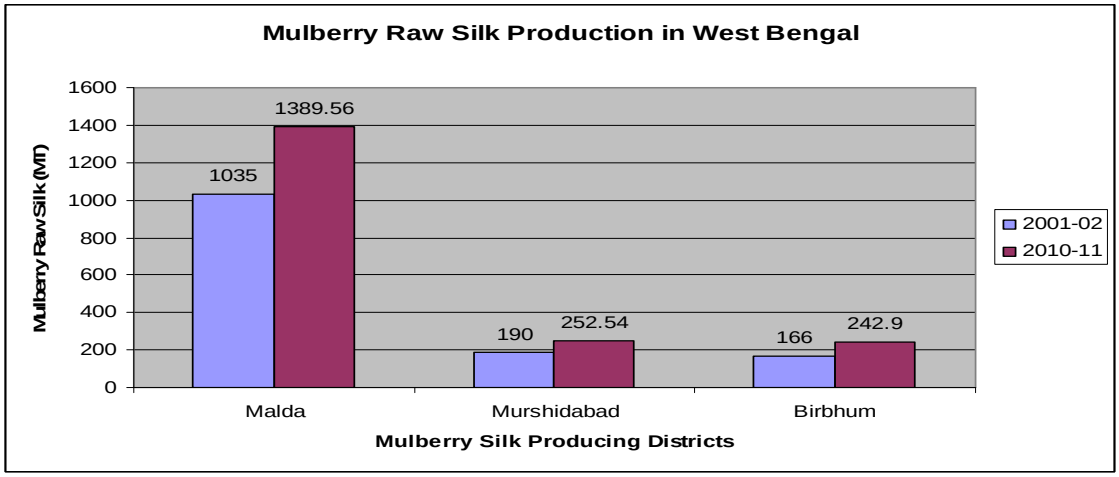
Birbhum is the third major silk producing district producing 93MT of raw silk in 2010-11. Though plantation area during the last decade (i.e., 2001-2010) has shown a remarkable increment from 121.88 acres to 263.47acres, the raw silk production reflects a deteriorating trend. This reflects deterioration in productivity and casts doubt regarding the dissemination of technological know-how among artisans and farmers. From 166 MT of raw silk it was reduced to 93 MT of raw silk, showing a negative annual growth rate of -0.06%. But the astounding fact is that even after these diminishing parametric trends, the additional employment generation capacity has portrayed a favorable scenario. In 2001-02 the number of people additionally employed in the district was 1345 while in 2010-11 the same has been raised to 2108 persons.

Table 6.9 District wise Status of Mulberry Silk in West Bengal (as on 31/3/2011)

Districts of West Bengal	Plantation Area (Acres)	Production of Mulberry Raw Silk (MT)	Production of Silk Waste (MT)	Additional Employment Generation (no.)
Malda	366.68	1389.36	449.18	3093
Murshidabad	270.69	252.54	95.90	2166
Birbhum	263.47	242.90	93.0	2108
Bankura	26.00	0.01	0	128

Source : DoS, West Bengal (2011)

Fig 6.3 District wise Growth in Raw Silk Production in West Bengal (2001, 2010)



Source : DoS, West Bengal (2011)

The pertinent issue at this juncture is the impact of globalization in the artisanal silk industry of West Bengal. It has been observed that the globalization did not leave its grip from this tradition bound artisanal industry in West Bengal, where the knowledge trickles down to the generations and support in livelihood generation across the genders of the household farms. The cheap silk yarn from China, Korea and Japan started flooding into this regional market since 2001 which resulted in a sharp decline in the prices of reeling cocoon. Malda cocoon market witnessed a steep decline in the rate of cocoon from Rs.100/ kg to Rs. 40/kg within two years[1] (Saeed, 2003). The huge inflow of exotic high grade silk yarn from China at a very low price (which was buffeted by hidden subsidy) had in turn uprooted a large portion of mulberry cultivation and 30-40% of mulberry field were replaced by mango trees (Deputy Director Reeling Malda, 2005).

However, anti-dumping regulation in 2003 was able to control large portions of mulberry uprooting in Malda and Murshidabad and controlled dwindling of this heritage industry. Fig 6.3 enables us to understand how the artisanal silk districts of West Bengal handled the fierce competition emerging from globalisation during 2001-02 to 2010-11, with the effective institutional support, like, anti-dumping regulations. Since West Bengal produces bivoltine silk in very meager proportions, that seems to restrict the foreign exchange earning capacity of the state to a great extent. Bivoltine silk has a quality edge over multivoltine silk with superior denier[2] quality. However, despite these shortcomings, around 30 percent of its mulberry silk was exported during the early 1990s (Banerjee, 1995) and in 2011-12 West Bengal exported 179.96 lakh square meters of silk to foreign countries and earned as high as Rs. 61 crores of rupees. The Regional Office of Kolkata issued a host of certificates to accredit the quality efficiency of the exported silk. These certificates are Generalized System of Preference Certificate, Handloom Certificate, Handicraft Certificate, Certificate of Origin, Special Certificate of Origin of Australia, Switzerland etc.

Table 6.10 Production & Value of Sericulture Product of West Bengal

Mulberry Reeling Cocoon	Production (MT)			Average Price/Kg			Value (Rs in Lakh)		
	’09-10	‘10-11	’11-12	’09-10	‘10-11	’11-12	‘09-10	‘10-11	’11-12
Multivoltine	1329	147	60.9	100	123	125	1329	181	76
Cross-Breed	15939	17352	17782	150	165	170	23908	28631	30229
Bivoltine	3.4	25.8	31.8	160	180	180	25242	28858	30364

Source: Directorate of Sericulture, Government of West Bengal (http://www.seriwbgov.org/ accessed on 13/2/2014)

In West Bengal, three varieties of reeling cocoons are bred, which includes multivoltine, crossvoltine and bivoltine. Table 6.10 helps in analysing the value generation from reeling cocoon during 2009-2012. The income generation from bivoltine reeling cocoon produced in West Bengal was Rs. 25242 lakh in 2009-2010, which rose to Rs. 28858 lakh in 2010-11 and Rs. 30364 lakh in 2011-12. The share of crossbreed mulberry cocoons occupies dominant position in the production of reeling cocoon. Malda and Murshidabad were the two dominant districts where the share of Cross-Breed reeling cocoons production remained at 98.84% and 98.58% in 2010-11 (DoS Govt of WB, 2010-11). Bivoltine breeds are also cultivated but in restricted amount only in these two districts and these are the reasons which impede the states potential to excel in foreign markets.

Table 6.11 Status of Mulberry Raw-Silk in West Bengal

	As on 31/3/2011	**As on 31/3/2012**	**As on 31/3/2013**
Mulberry Area (ha)	13116.7	13685.1	14231.7
Raw Silk Production (MT)	1885	1923.78	2018
Land Productivity (Kg/ha)	143.7	140.6	141.8
Employment Generation	259736	270992	281816
Labour Productivity (Kg/ labour)	7.26	7.09	7.16

Source: Directorate of Textile (Sericulture), Govt of WB (http://www.seriwbgov.org/vision.aspx# accessed on 13/12/2014

Table 6.11 portrays the recent growth trajectory faced by the artisanal silk industry in West Bengal. Mulberry area of the state has extended from 32467 acres to 35227 acres while raw silk production has increased fro 1885 MT to 2018 MT during this period. The employment

generation has also shown an upward trend during this phase. The land productivity has shown a marginal fall in acreage productivity hovering within the range of 141 and 144 kg/ha. The labour productivity also reflects a similar trend and hovers around 7.1 to 7.3 kg per labour.

6.3.3. Supply Chains in Artisanal Silk Industry of West Bengal

Silk is produced in the rural regions of West Bengal, where predominance of backward people are observed whose socio-economic structure direly needs an assured return with lower capital investment capabilities. The activities of artisanal sericulture are performed through an extensive supply chain. The supply chain for artisanal silk industry starts from the basic production of silkworms by farmers through feeding mulberry leaves by rearers. At its initial stage, the supply chain includes those who are engaged in mulberry cultivation and then those who produce and sell silkworm eggs and to the silk-rearers. Silk rearers are those who raise the silkworms and sell the cocoon to the reelers and spinners who purchase silkworm cocoons either directly from cocoon markets or through agents. Silk thus produced and processed are called raw silk. This raw silk is again processed to convert it into twisted yarn. Most of the work of processing the yarn includes degumming, bleaching, colouring and winding. Thus through trading merchants ultimately the processed raw silk comes to the hands of weavers. The weavers produce the silk fabrics and sell it to traders who bring the final good either to the domestic or to the foreign customers.

6.12 Caste Based Classification of Mulberry Sericulture Farmers cum Rearers in West Bengal during 2011-12

Districts	SC	ST	Others	Total
Malda	542	0	58502	59044
Murshidabad	3318	0	11275	14593
Birbhum	7740	12	2673	10425
West Bengal	15999	968	79523	96490

Source: Annual Report-2011-12, Directorate of Sericulture, Government of West Bengal

Almost all these activities are largely based on family labour. The districts in which the rearing and reeling activities are predominantly located have a high percentage of wage labour in the aggregate rural workforce (Banerjee, 1995). Malda has the largest percentage of mulberry silk rearers (61%) and reelers (50%) in the state (DoS-Govt of WB, 2011-12) while 15% of state silk rearers and 40 % of state silk reelers reside in Murshidabad (See figure 6.13). Rearing and reeling are largely dominated by backward class people and Muslim minorities, as Malda and Murshidabad districts are dominated by people belonging to the communities of religious minority. The recent available statistics on West Bengal reveals that in 2011-12 the mulberry silk production involved 96490 sericultural families of which 16.6 per cent belonged to SC categories and 1% belonged to ST categories (See table 6.12). The tribal involvement is as large as 69 % in tasar silk and 67% in eri silk during 2011-12. Tasar silk is largely cultivated in Bankura and Purulia, while eri silk is popular in Jalapaiguri and muga silk is famous in Cooch Behar. Mulberry silk is the largest producing silk in the world as well as in the country; West Bengal is also not an exception. Malda, Murshidabad and Birbhum are the states where mulberry silk producing activities at all levels are quite vibrant. Bankura is the only state where mulberry silk weaving has a strong base and it has a heritage of producing *baluchari* sari.

According to Banerjee (1990), the mulberry cultivators in West Bengal can be classified into three major groups – (1) the small cultivators who put all or major portions of their lands under mulberry cultivation and the rest under paddy cultivation; (2) middle cultivators who have sizeable lands under mulberry cultivation while greater share is kept for alternative crops production; (3) big cultivators whose area of mulberry cultivation seems to be insignificant than their total possession of lands. In West Bengal, there is no market for mulberry leaf and cocoon rearers are actually cultivating mulberry most of the time. The market for sericulture output is dominated by trading classes who are not usually engaged in sphere of production but dominate the markets of silk cocoons and silk yarn by providing working capital. There are three principal agents who procure cocoons from poor rearers for reeling. They are (a) local intermediaries, (b) agents of government filature units, (c) private small reelers. Again there are two principal agents who procure silk yarn for delivery into the weavers' hub, i.e., (i) the local intermediaries and (ii) weavers' cooperative societies.

Table 6.13 District-wise Numbers of Artisans in Mulberry Silk Industry of West Bengal during 2011-12

Districts	Farmers & Rearers	Reelers	Weavers
Darjeeling	1435	0	0
Jalpaiguri	1830	0	0
Cooch Behar	1050	0	0
Uttar Dinajpur	1851	0	0
Dakshin Dinajpur	720	0	0
Malda	**59044**	**8231**	**6180**
Murshidabad	**14593**	**6586**	**15160**
Birbhum	**10425**	**1650**	**2550**
Nadia	3203	0	10
24 Parganas (N+S)	370	0	0
Bankura	564	0	**3140**
Purulia	353	0	0
Burdwan	38	0	0
Medinipur (Purba + Paschim)	1014	0	0
WEST BENGAL	**96490**	**16467**	**27040**

Source: Annual Report-2011-12, Directorate of Sericulture, Government of West Bengal

The silk weaving materials can be categorized into three categories – HG (high grade silk material), MG (middle grade silk material) and LG (lower grade silk material). The high grade silk materials are usually produced in highly efficient Jacquard looms (throw shuttle type) while MG and LG materials are produced on the ordinary traditional wooden looms. The traditional ordinary loom is capable of producing only coarse design while jacquard looms are accomplished for its sophisticated design. The labour time requirement to operate the jacquard loom is much less than that of traditional looms. The weavers can continually work in a jacquard loom while traditional looms require certain time gap for functioning properly. However, these machines are expensive which restricts its use among weavers in West Bengal (Banerjee, 1995). Besides, the costs of design making, transferring the designs on to the cards by the system of punching, the costs on loom setting with a huge volume of yarn make it prohibitive to common weavers. The common weavers of Bengal, whether residing in Murshidabad or Bankura thus prefer ordinary looms.

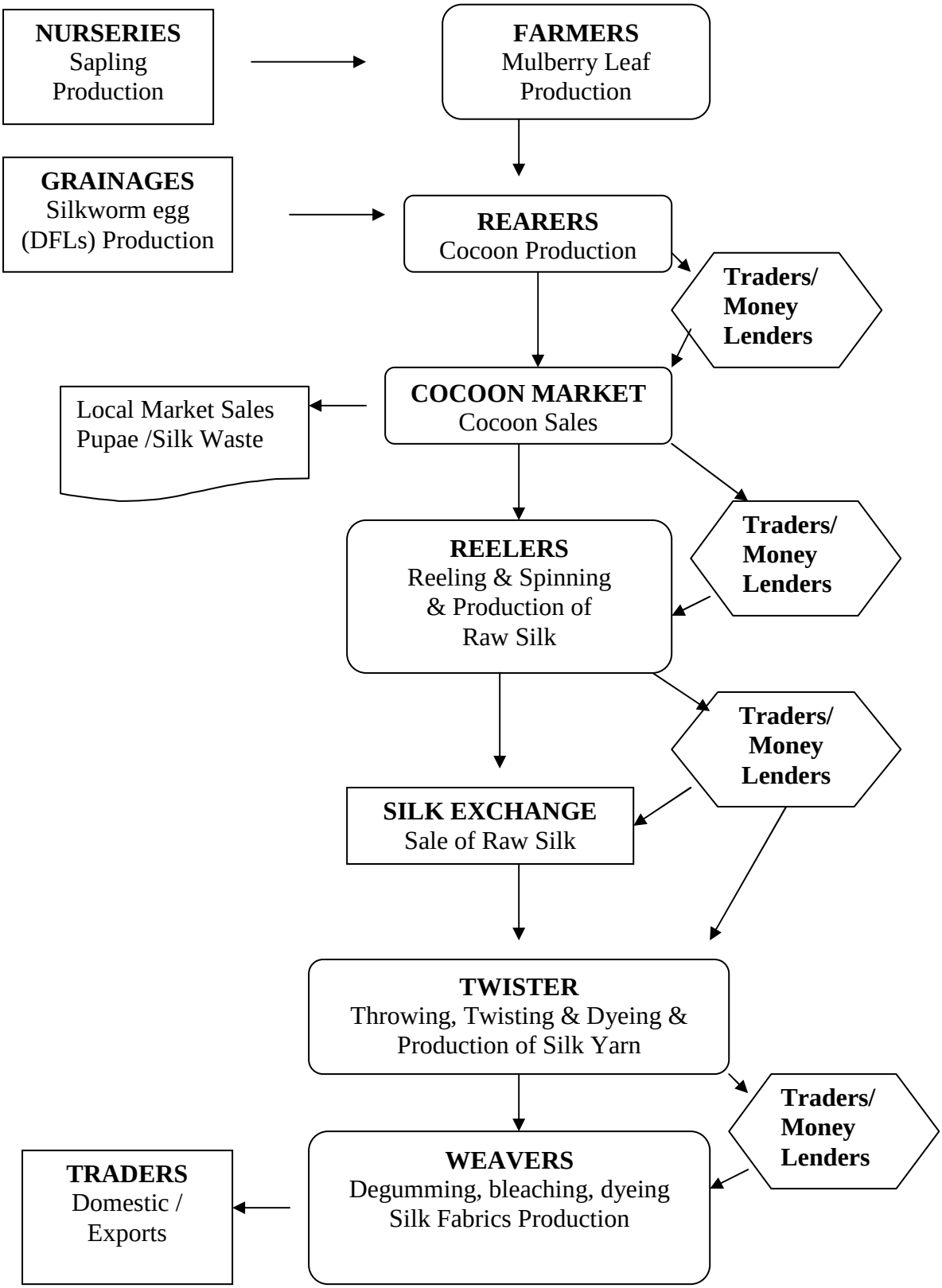
In silk weaving of West Bengal, there exist broadly two types of entrepreneurs - (i) those who under take weaving only, (ii) those who own reeling/spinning units and also assign subcontract work to domestic weavers. Thus the latter constitute vertical integration in

artisanal silk industry. They form societies, while the former constitute either local private silk merchants or societies. Again societies can be of two types- (a) Cooperatives where the members are equity holders and net profit is distributed among the members according to their equity share; (b) the charitable societies which are formed by seven or more individuals. Banerjee (1995) found that most of these latter type of societies engaged in weaving and/or reeling, are floated with the members of family based household industries. These societies are certified by KVIC (Khadi Village Industries Commission) or KVIB (Khadi Village Industries Board). All the KVIC/KVIB societies are supposed to create the backward linkage, i.e., with reeling/spinning unit under their own initiatives. Only in exceptional cases they are entitled to buy products from outside.

From the annual report of 2011-12 of Directorate of Sericulture, Government of West Bengal, it was found that presently 32 reeling cooperatives units are in operational stage.

Majority of the silk weavers in West Bengal work on their own looms in their own houses using machineries obtained either from societies or private silk merchants. They receive piece-rate wages from putters-out and thus the agents who actually subcontract the work to individual weavers play a dominant role.
The weaver, just by virtue of his ownership of the weaving tools is not an independent manufacturer. Even the independent and comparatively affluent weaver who owns a loom and work with own raw materials (i.e., yarn etc.) is largely subjected to the conditions of the output market. It is the silk merchants who provide marketing channels for most of the outputs by otherwise independent weavers. Thus the weaving artisanal classes are at the mercy of the dominant merchant class. The tragedy is that the poor artisan classes are left with no choice other than depending on money lenders for the working capital. This often results in contractual bondage of these artisanal classes to money lenders, which has proved to be unfavourable in terms of realization of returns for this artisanal silk industry in West Bengal.

Fig 6.4 Supply Chain in Artisanal Silk Industry (Mulberry) of West Bengal



6.3.4 Problems faced by various Stakeholders at different stages of Supply-chain of Artisanal Silk Industry of West Bengal

The major impediments in sericulture development across the districts in West Bengal can be identified as lack of region specific silkworm breeding technology suitable for West Bengal condition, small land holding of the mulberry cultivators and poor socio-economic condition of artisans, extreme climatic condition, under-developed post cocoon sector which includes reeling and spinning sector, ill-developed powerloom division, etc. However, it would be worth analyzing if the issues can be categorized under the different stages of the supply chain in the artisanal silk industry. Grossly, we categorize the supply chain into four stages- (i) Mulberry cultivation; (ii) Silkworm rearing; (ii) Reeling, Spinning & Twisting; (iii) Silk Weaving. Farmers and artisans connected with each phase of the supply-chain faces several problems, some of which are general and the rest of them are region specific issues. This section gives the opportunity to delineate those difficulties which is hindering the growth of artisanal silk industry in West Bengal.

(i) Problems faced by the Mulberry Farmers

- Most of the mulberry cultivators possess fragmented mulberry lands which raise its operational costs.
- Closer proximity of mulberry lands to the residential area opens up the possibility of infiltration by domestic cattle to graze the lands and that enhances protection cost of the mulberry cultivators.
- Large numbers of silk worm rearers in the districts of West Bengal do not have adequate land and irrigation facilities for cultivating mulberry. They purchase mulberry-leaves from the market.
- 60% land of mulberry cultivation in Malda is low lying, which is flooded every year during the monsoon. Stagnation of water is harmful for mulberry cuttings and that creates scarcity of cuttings in the market.
- Ali (2008) commented that mulberry leaf productivity is gradually diminishing due to knot nematode diseases of the roots and the local variety is more susceptible to the diseases compared to the improved variety.
- The use of manures and fertilizers per acre of land is very low in the district of West Bengal, which lowers the productivity of mulberry leaf. Moreover, it is not possible for the farmer to invest large amount of money to upgrade productivity. Even big farmers and landlords also lease their surplus land to poor farmer who grow mulberry.
- Despite efforts of the Technical Service centres, transfer of modern technology to the farmers is substantially low due to their intrinsic backwardness coupled with illiteracy.

(ii) Problems of the Silkworm Rearers

- Silkworm rearers purchase eggs without the knowledge about its quality. As there is lack of testing facilities across the districts of West Bengal, rearers are bound to purchase eggs of inferior quality from local non-licensed grainages and that affects quality of silkworms. For example, Malda is not self-sufficient in the supply of DFLs from the Central Silk Board and the State Governments and it also comes from local licensed or non-licensed grainages.
- Due to poor economic backgrounds, most of the silkworm rearers in the districts of West Bengal do not have separate silkworm rearing house with modern equipments

like open window, net, fan, air, cooler, heater etc. The rearers also use traditional methods to disinfect the rooms and thereby making the process more unhygienic leading to low productivity in silk.

- Paucity of working capital is actually the crux of all issues. Due to financial insolvency the rearers can neither buy high quality DFLs, nor purchase mulberry leaves of premium quality.
- Silkworm cocoons are sold within 5-6 days of harvesting and reach to silk weaving centres through various intermediaries or channels. It has been noticed that the marketing of mulberry cocoon is officially regulated in all major silk producing states of the country except West Bengal. The cocoons are sold and reeled within 10 days before the moth pierces the cocoon and therefore most of the time rearers make distress sale becoming pawns at the hands of mahajans, private agencies or reelers.

(iii) Problems of the Silk Reelers

- Silk reeling equipments can be broadly classified into four units – Traditional Unit or Charka, Cottage Basins[3], Multi-end Reeling Machines and Filature. Besides filature and multi end reeling machines all other units are based on elementary technology and restrict the scope of reeling quality silk. West Bengal presently possesses 2 state run filatures and 4 state run multi-reeling machines in 2011-12 while comparatively large number of charka units (10400 numbers) and cottage basins (8556 numbers) are available under private ownership.
- There is one state run filature at Madhughat in Malda district and another in Berhampore in Murshidabad, the optimum production rate of which is about 800 to 850 grams of silk yarn per day (De Sarkar et al., 2013); But the volume of cocoons the government agency could procure can hardly satisfy 20-25 percent requirement of these reeling units to run the filature.
- Reelers of West Bengal procure a sizeable quantum of dry cocoons from outside market viz, Maharashtra and Jammu & Kashmir. Though the state has an extensive base of primary cocoon production but quality cocoon is still brought from outside market, which raises the transaction cost and raw silk production becomes cost inefficient.
- The forward linkage sector, i.e., the weaving sector is underdeveloped in West Bengal. The reelers of West Bengal largely look forward to the southern states and, Benaras and Bhagalpur for the disposal of processed yarn.

(iii) Problems of the Silk Fabric Weavers

- Weavers belonging to the Societies collect raw materials through societies while independent weavers in West Bengal are free to mobilize yarn from the market and undertake independent weaving. In fact, they are able to procure yarn from the silk reelers on credit. But in that case they have to depend upon private silk merchants who claim unusual share in the value added.
- Most of the silk weavers are using pit looms in almost all the societies as well as handloom clusters. These looms are dangerous especially in the monsoon as the pits become favourite dwelling places of poisonous snakes. On the other hand, the frame looms are too expensive for the poor artisans as well as for the societies.
- No trade union body is in existence for the weavers and their wage is being fixed by the apex body of the society. The private silk merchants operate just at the lower level

and their competitiveness is largely a contribution of captive labour force and ultimately the labour is paid a price which is less than his value of marginal product (Banerjee, 1995).

6.4 Conclusion

Sericulture, as is evident now, is an important livelihood option in rural West Bengal providing employment to more than 1 lakh families in the rural and semi-urban areas. The productivity level of sericulture (land and leaf) is not low compared to that of the major silk producing states in the country, which opens further scope to research and analyse about its productivity. A field level survey in the major silk producing district of West Bengal, i.e., Malda, will be helpful to identify the issues on the field. The next chapter would make an empirical analysis of these survey findings while this chapter in a nutshell has thrown light on the evolution of sericulture in West Bengal as a whole since the inception of the planning period. A state level comparative study has confirmed that land based productivity is not hindering the growth of mulberry sericulture in West Bengal while progress of the artisanal silk industry reveals loopholes in several dimensions. Small holding capacity of the rural farmers and poor economic condition of the artisans have been identified as major impediments in the path of development of sericulture in West Bengal. The rural moneylenders/ traders (*dadani mahajan*) utilizes this advantage and extracts a major part of the pay-off intruding into the supply chain of the industry. It has been found that in Malda district approximately Rs. 10-12 crores are getting rolled as capital investment and source of this working capital lies with rural traders who ultimately claims unusual share from their value addition. In the textile policy the objective of the Central as well as State government always concentrates on the extension of sericulture through acreage and production, ignoring the exploitation of the artisanal classes at each level of value addition in the supply chain. In the absence of institutional apathy and well-linked credit system in these remote rural areas coupled with financial illiteracy of the rural artisans, the objective of development seems to be far away. The Twelfth Five Year Plan (2012-2017) has especially focused on certain issues of sericulture as major goals or aspirations for the development of sericulture through rural reconstruction. Evolution of season and climate specific, disease resistant robust silkworm breeds has been given greater emphasis. The technology feasibility study in consultation with Central Silk Board and JICA (Japanese International Co-operation Agency) is already under process. Establishment of a Silk Park at Malda is also about to take place in the near future. Another important endeavour has been to link sericulture with major agro-based program like RKVY (Rashtriya Krishi Vikas Yojana), MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), which are expected to bring better funds to this sector.

End Notes

1. For details, see Saeed Muhammed (2003): Technical Barriers to Trade- Cheap Silk yarn Imports threatens Bengal Farmers, The World Trade Review, Vol No. 3.(6) .
2. Denier is a weight through which fineness of the silk is measured and average denier of a bivoltine silk is much smoother than that of multivoltine silk.
3. Charka and Cottage basin are the simple appliances of silk reeling which require two persons to for operation. The Cottage basin is an improvement over the charka, but both severely restrict the scope for reeling quality silk.
4. For details See Bagchi, S.N., Saha, A.K., Ghosh, A.,Sengupta, D.,Das,S.K. and Sarkar, A. (2008), Development of Sericulture in West Bengal through IVLP, Indian Silk, Vol.27.,No.2, June, 2008, p. 12-15.
5. For details See Saha, A.K., Datta-Biswas, T., Das, S.K. and Mohanty, S.M. (2008), Bivoltine Rearing during Adverse Season in West Bengal, Indian Silk, Vol 47, No.1, May, 2008, p.5-7.

CHAPTER: 7

An Empirical Analysis on Income & Employment Generating Issues in Artisanal Silk Industry of West Bengal (A Case Study of Malda District)

7.1 Introduction

The preceding chapter elaborates on the successful increase in raw silk production in West Bengal, especially in mulberry variety with higher productivity. During 1980-2004, a positive annual growth of 4.16 percent was observed while the annual growth in mulberry area during the same period had been only 1.83 percent (Lakshmanan, 2007). This higher growth of production level over area of cultivation indicates a vertical growth of sericulture in the state instead of horizontal extension. It has also been noted that sericulture is practiced in few concentrated regions of West Bengal compared to other traditional silk producing states. As evidential support we can state that West Bengal has highest 'sericulture families per village ratio' i.e., 48.9%, while in Karnataka, Andhra Pradesh and Tamil Nadu this ratio is only at 14.29%, 13.32% and 5.26% level, respectively (CSB, 2003). This spatial concentration leads to the development of a particular region depending on this livelihood. Malda district is such region in West Bengal where a large number of rural and semi urban population is engaged with this vocation and which produces 75 percent of the state's production (Ali, 2008). This chapter is based on a field survey of certain sericulture rich villages in Malda district.

In the post globalised era while millennium development goals are emphasizing on inclusive development and rural income-employment generating issues are receiving top priorities to combat with inequality and poverty, this regional rural analysis is expected to add few important insights regarding these issues. The increasing popularity of sericulture has been attributed to its short gestation period and quick recycling of resources (Anantha Raman et al., 2007). Sericulture is also such a livelihood where the entire range of activities generates a moderate flow of income and creates employment opportunities for a substantial number of female labourers both inside and outside the domestic sphere. Women workers whether domestic or hired, play a very significant role in the activities spectrum as well as in decision-making of this household business. According to general perception, women's role is mostly confined to silkworm rearing, but in reality it goes far beyond this. Leaving the shackles of gender-stereotyping, women in sericulture often take part in mulberry planting, weeding, manuring, irrigating, leaf picking, leaf transporting and storage. In silkworm rearing, they are engaged in leaf-cutting, feeding, bed cleaning, worm spacing, mounting, harvesting and disinfections. Contribution of women labour is substantial in silk reeling and silk weaving, too.

The entire sub sectors, which include silkworm-seed sector, cocoon sector, post-cocoon sector, fall under the cottage and small scale sector. It particularly suits all those rural marginal farmers and artisans, who do not have sufficient funds for investment but need a higher return to combat against poverty. Compared to other traditional silk producing states like Karnataka and Andhra Pradesh, sericulture is still an unimproved rural based activity in West Bengal depending mainly on the flows of intergeneration skill of the rural artisans. Researchers opine that there exists a significant gap in productivity at farmers' level and yield potential in West Bengal (Bagchi et.al., 2008). Major reasons for low acceptance of the technologies were identified as inadequate linkage between scientists and farmers, the former being not in consonance with the farmers' need and non-compatibility with the total farming system. Corporate entry in this sector is still a distant dream and the authority support is at bare low level much less from its deserving threshold. Sericulture-artisans often go through multidimensional problems in the process of income generation, which will be empirically analysed in this chapter. However, the opportunity of the sector lies in its income effect associated with the large section of downtrodden artisans who could in turn generate a large

spillover effect in the society as a whole. Poverty and income inequality can be harnessed if expansion of sericulture can be sustained in the rural sector. As a matter of fact, it has been observed that in sericulture 57% of its final value is ploughed back to the primary producers (Gangopadhyay, 2008). Again, according to Mattigatti (2000), the price spread of sericulture goods accounts for 48.4% for the mulberry farmers-silkworm rearers, 17.7% goes back to reelers & twisters and 12.3% goes back to weavers and dyers. Thus sericulture supports in promoting the growth in income level of the excluded group and can be considered as an engine of inclusive growth in agro-based developing economy.

Employment generation is the other major potential of the artisanal silk sector especially in the rural unorganized sector. The farm and non-farm activity of this sector creates sixty lakh employment every year in rural and semi-urban India. The significant part of this employment generation includes its capability of transferring wealth from high end urban customers to poor artisan classes. In West Bengal, 1.14 lakh families are occupied with sericulture activities in 2339 villages during 2010-11 (DoS- Govt of West Bengal, 2011). During the five years of the Eleventh Plan (2007-12), the production of raw silk in West Bengal rose from 1660 MT to 1924MT showing an annual growth of 2.9 percent while the employment generation for the consecutive period shows a decline from 3.03 lakh to 2.71 lakh (http://seriwbgov.org). This rising production trend coupled with declining employment trends raises few queries which will be addressed in this chapter.

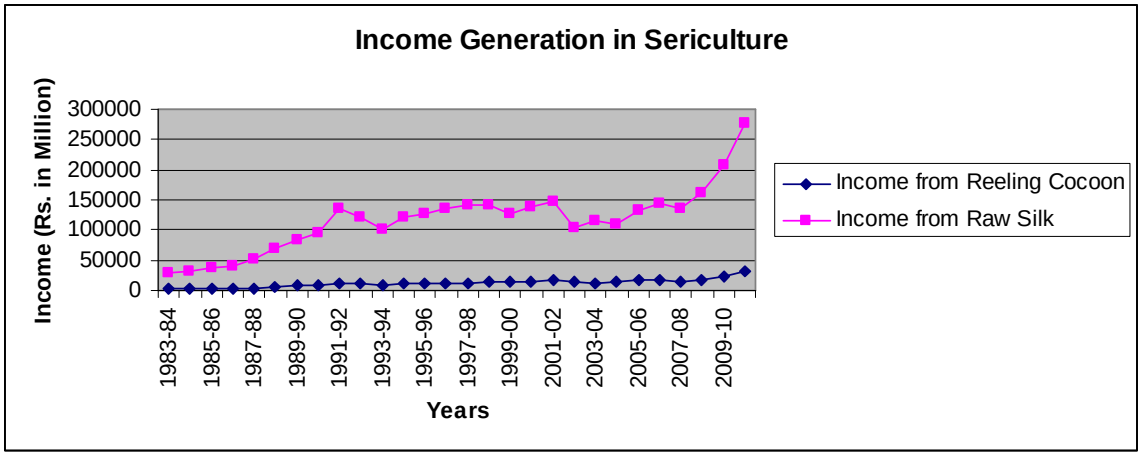
The prime objective of this chapter is to delve into various intricate issues of income and employment generation in the artisanal silk industry of West Bengal. Econometric analysis will help to identify the significant explanatory variables behind the income and employment generation of this artisanal silk industry in West Bengal. Multivariate regression analysis will be attempted on the data collected from certain sericulture rich villages in Malda district. These results will provide regional reflection as compared to that estimated on the basis of national level secondary data on silk production.

7.2 Income Generation Trends in Indian Sericulture in Pre & Post Period of Globalisation (1983-2011)

Sericulture is a vertically integrated industry where starting from mulberry cultivators and silkworm-rearers, different producers adds value in assembling the production up to raw-silk production. The raw silk is again transformed to soft-silk by dyeing and printing on it and ultimately the silk-fabric is sold as a semifinal/final product to the consumers in the market. However, domestic production data regarding reeling cocoon and raw-silk is widely available including its price variation. Place of raw-silk is also higher in the assembly-line compared to reeling cocoon. Therefore it may be assumed that value of raw silk is inclusive of the value of reeling cocoon. Therefore, in this section we will analyse the income generation trends of raw silk production, as it would automatically include the trends of income generation by the reeling cocoon production. Comprehensive and simultaneous data on price and output of both raw-silk is available for 1983-2011. The period is also significant in the sense that it can help us to compare the trend in the pre and post globalization period. Value of reeling cocoon production has maintained a horizontal trend, which implies that the reelers maintained a positional constancy during this period. On the other hand, value of raw silk has maintained a positive rising trend in the pre-liberalization period (i.e., during 1983-1991), while effect of globalization has blocked the rising trend and fluctuations were observed up to 2005-06 and thereafter the income generation in sericulture has taken a progressive trend (See Fig 7.1).

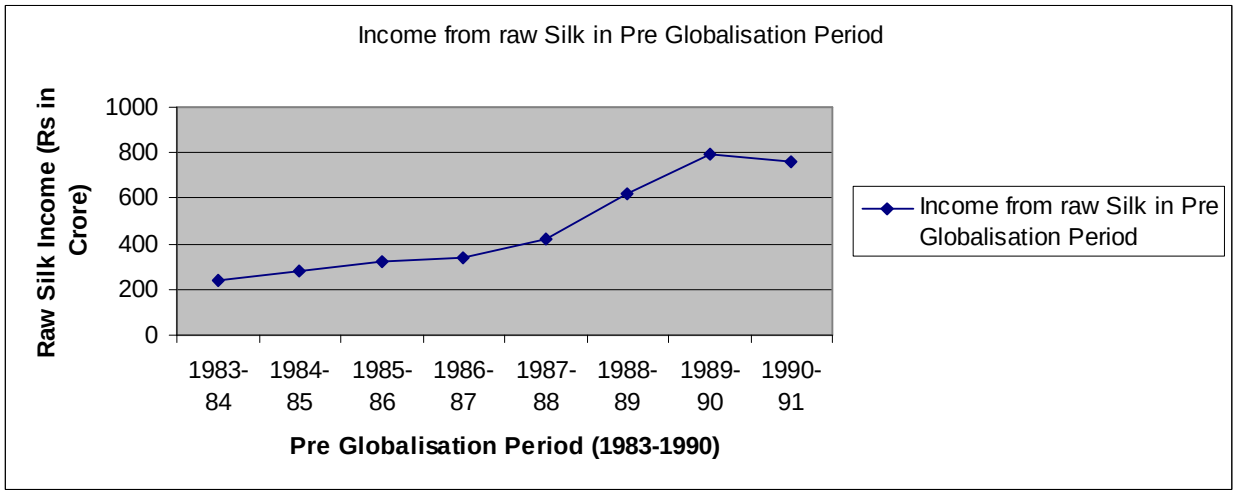
Rising trend in income generation from raw-silk production from the year 2005 onwards can be attributed to the rising prices of raw-silk, which is an off-shoot of antidumping regulations imposed by Government of India on imports of Chinese silk. This provided protection to a large number of silk rearers and reelers, though silk weavers have been adversely affected through the price rise of their raw materials, i.e., raw silk. However, the rise in income is responsible for increasing trends of both production of raw silk as well as prices of it.

Fig 7.1 Income Generation Trends in Sericulture in India (1983-2011)



Source : Central Silk Board, 1999, 2003, (online data)

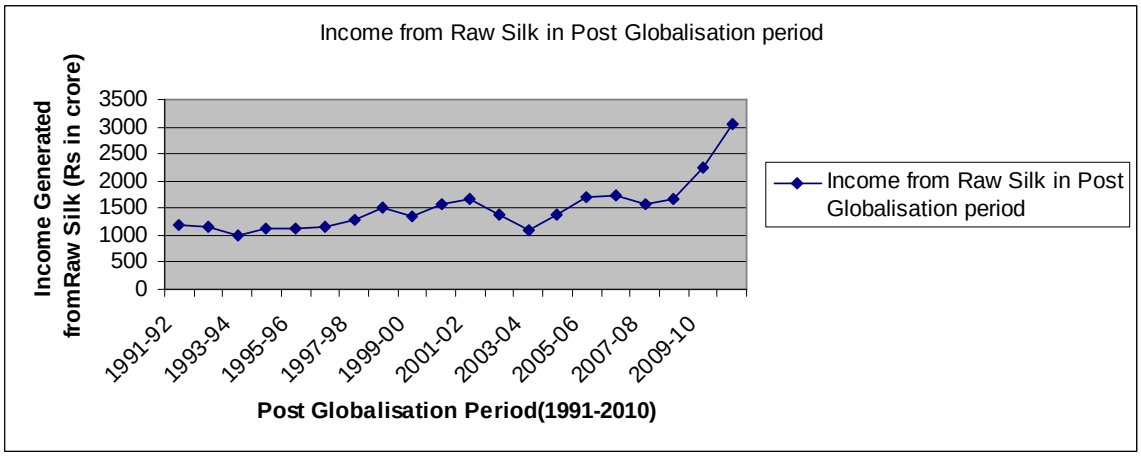
Fig 7.2 (a) Income Generation from Raw Silk in Pre Globalisation Period



The reasons for the rise in production again depends upon a host of factors like area of mulberry cultivation, amount of reeling cocoon production, price of reeling cocoon, and also on amount of raw silk imports. Raw silk is sold to the merchants and dyers and printers who manufacture the final good, i.e., silk fabric/ silk cloth. This part of activity is usually centered in urban and semi urban areas. Though the rising trend of income generation of silk fabrics over the years (1991- 2011) ensures the growing demand of the product in the society, the study primarily explains the factors behind this income generation through raw silk production. Raw silk producers are mostly concentrated in rural locations and any rising trend of income would signify a step forward towards poverty alleviation. The secondary national level time series data is available on silk production from Central Silk Board database as well as state level data for few years. On the basis of earlier hypotheses models of income generation will be constructed with the help of national level data. Against this background,

the field level survey would add some special insight which can be justified as influential-regional factors playing dominant roles during the process of income generation in artisanal silk industry.

Fig 7.2 (b) Income Generation from Raw Silk in Post Globalisation Period



CAGR (1983-1990) = 18.1% growth in income generation from raw silk
CAGR (1990-2010) = 5.1% growth in income generation from raw silk

7.2.1 National Level Model of Income Generation from Silk Production

On the basis of the available secondary data of 28 consecutive years (1983-2011), a model of income generation is constructed in this section. From the usual perception it can be assumed that income generated from raw silk production (Y) is dependent on certain variables like area of mulberry cultivation, price of reeling cocoon, quantity of reeling cocoon, amount of raw silk imports, number of persons employed in the sector. Mulberry leaf is food for silkworm and therefore higher the area of mulberry cultivation higher will be the raw silk production and its income. Reeling cocoon is the input through which raw silk yarn is produced through reeling, spinning, twisting and winding. Therefore a greater number of reeling cocoon will suggest higher raw silk and silk yarn production and higher associated income. Similarly, price of reeling cocoon is also a vital explanatory factor for income generated from selling of raw-silk. Again income from raw silk is also dependent on employment generation from sericulture as higher levels of involvement are expected to raise the level of income generation. Barring all these factors, imports of raw silk also have certain influence on income generation out of selling raw silk. Assuming a linear relationship between the dependent and independent variables, we may write up the following equation which captures the essence of income generation in this raw silk sector.

<u>Income Generation Model</u>

$$y = \alpha_0 + \alpha_1 x_1 + \alpha_2 x_2 + a_3 x_3 + \alpha_4 x_4$$

Where, y = income of the raw silk producers
x_1 = area of mulberry cultivation;
x_2 = price of reeling cocoon;
x_3 = quantity of reeling cocoon;

x_4 = quantity of raw-silk imports;

Regressing with Ordinary Least Square Method on the time-series data (1983-2011), with various combinations of predictors, the following econometric results are found. The F-statistic= 412.353 (with 27 degree of freedom), is found to be significant in the following model assuring goodness of fit of the model.

Table 7.1 Estimated Coefficients of Income Generation Model

Explanatory Variables	Estimated Coefficients	T	P- Value	Collinearity Statistics VIF
Constant	-52632.1	-4.629	0.00	
Area_ha (x_1)	0.174	4.759	0.00	1.149
Pr_RC (x_2)	1280.648	28.136	0.00	1.149

a Dependent Variable: INC_RS (Income from Raw Silk)

The Adjusted R^2 = 0.968, which explains around 97 percent data variation of the dependent variable can be explained by the regressors, which is quite satisfactory. The Durbin Watson Statistic = 2.25, which explains that no serial autocorrelation is present. The estimated regression coefficient shows no serious problems of multicollinearity, as the VIF (variance inflation factor) of all the coefficients are significantly less than 5. Thus meaningful econometric relationship of income generated from raw-silk production (INC_RS= y) can be traced only with Area of Mulberry Cultivation (AREA_HA = x_1) and Price of Reeling Cocoon (PR_RC= x_2).

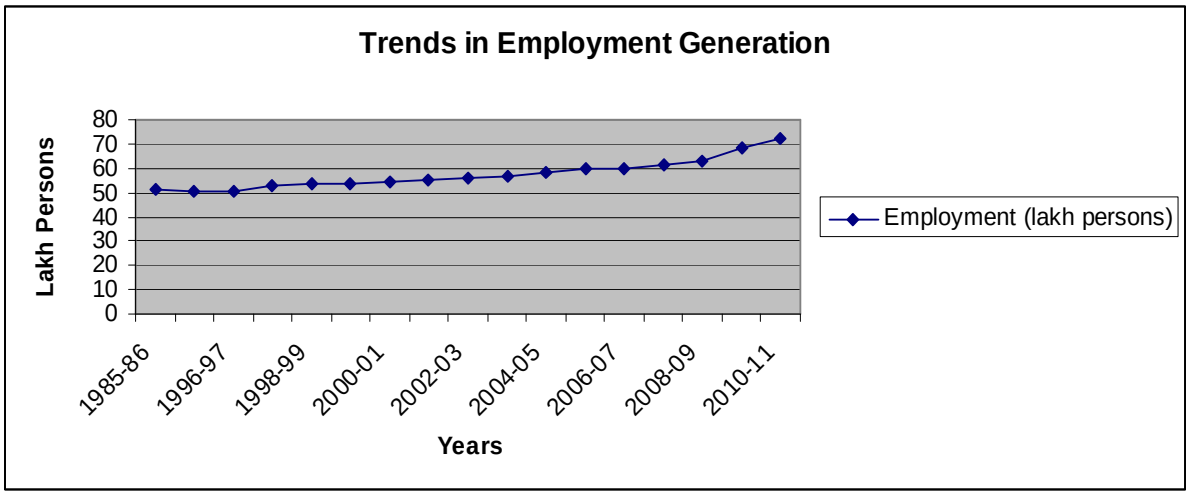
The above estimated regression equation signifies that in the absence of mulberry cultivation area and zero price of reeling cocoon, income-generation from raw silk is virtually negative. Though negative income generation is apparently unlikely to happen in real situation, but we can think about the loss of fixed cost for those farms whose production process has been ceased to zero. Despite producing nothing those farms earn negative income or loss. The intercept term explains that particular aspect for the sericulture farm. On the other hand, rise in mulberry cultivation area by 1 hectare would raise the aggregate income from raw silk production by 0.174 million, i.e., by Rs. 174,000, while rise in prices of the reeling cocoon will have greater impact on raising the level of income from raw silk production. If per kilogram price of reeling cocoon increases by 1 unit, the aggregate income from raw silk production will increase 1280 times. However, it should be kept in mind that price of reeling cocoon is a significant deciding factor for income generation in sericulture. The impact will therefore lessen if the price declines.

7.3 Trends in Employment Generation in Artisanal Silk Industry in India

The Statistics Biennial (CSB, 1986) data show an increase in employment opportunities in Indian artisanal silk sector from 16 lakh persons in the year 1979-80 to 51.52 lakh persons in 1985-86. The comprehensive and continuous employment statistics that is available from the period 1995-1996 onwards exhibits similar upward trend till date for the country (see Figure 3). The year 2006-2007 is marked as the level of employment in this artisanal industry reached its peak at 60.03 lakh persons; among which 47 lakh persons were sericulture farmers and the rest 13 lakh were engaged in off-farm activities (like, reeling, twisting, weaving etc.). This shows that sericulture generates more farm employment than non-farm employment opportunities.

Employment statistics also reveal that area of cultivation has started showing a declining trend from the mid 1990s. However, increase in land productivity (presumably due to irrigation or other technical innovations in cultivating high yielding variety mulberry cultivation) has helped to maintain the positive trend in output (see Figure7.4). A spurt in employment generation has been observed over the period 1995-96 to 2006-07. The output elasticity of employment has shown positive trend for most of the periods with aberrations in few years. This indicates that with a proportional increase in employment, there will be a proportional increase in output, but the value would never be greater than one.

Figure7.3 Employment Generation in Silk Production



Source: CSB, 2003, 2012

While Figure 7.4 depicts a moderately increasing trend in land productivity, Figure 7.5 captures the fact that labour productivity has experienced occasional ups and downs over the period 1979-80 to 2010-11. The output elasticity of employment in sericulture, on the other hand, is showing a downward trend with few spikes (see Figure 7.6). Thus, despite increase in the level of employment, sericulture output is not responding in significant proportions. This, in a way, establishes presence of over employment in sericulture sector, without any substantial marginal contribution. Rise in the level of land productivity and marginally declining trend in labour productivity actually result in fluctuations in output elasticity of employment. Elasticity of output never exceeded the value of unity, which confirms growth in raw silk was always less than that of employment generation.

Figure 7.4 Trends in Land Productivity of Raw Silk Production (1979-2010)

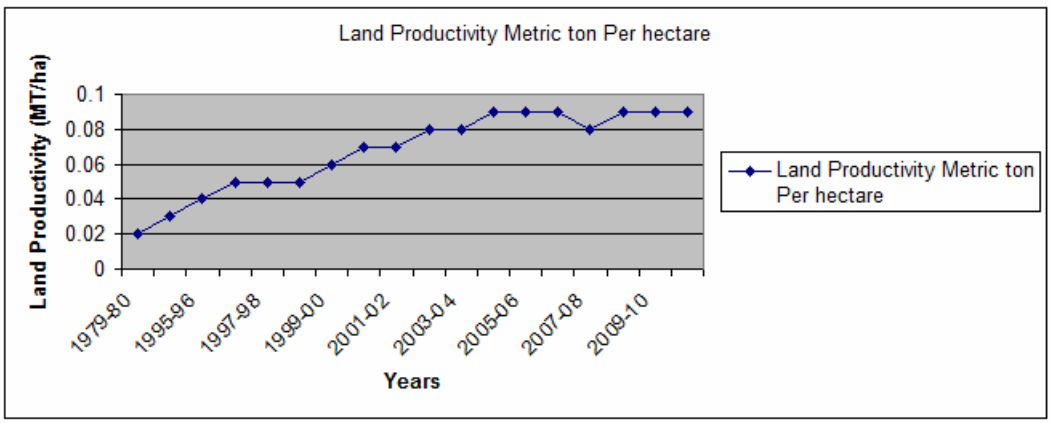


Figure 7.5 Trends in Labour Productivity (!979-2010)

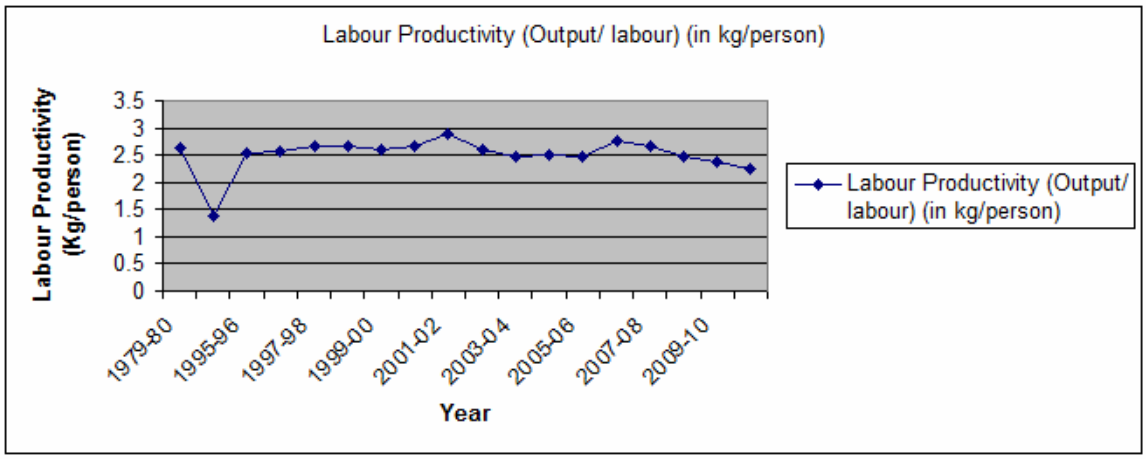
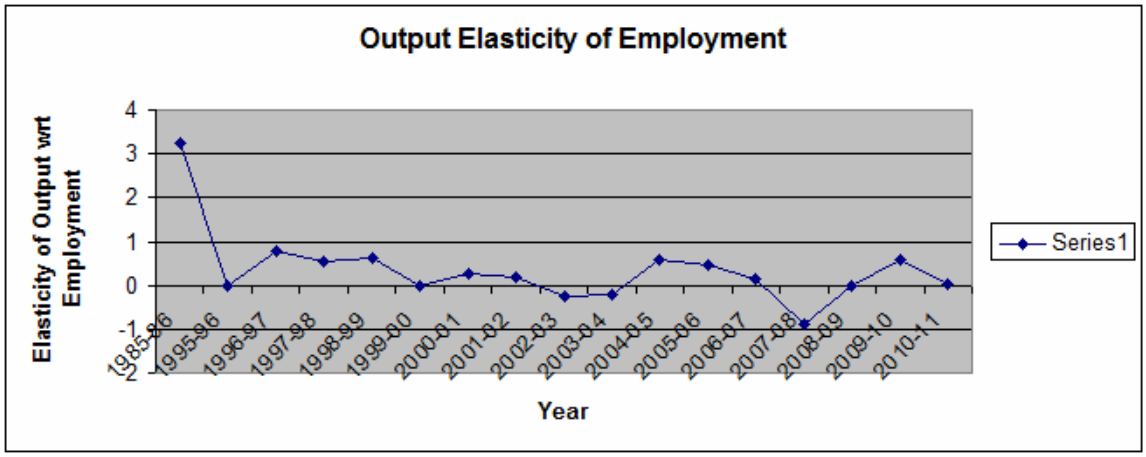


Figure7. 6 Trends in Output Elasticity of Employment (1985-2010)



7.3.1 Employment Generating Factors in Indian Sericulture

The primary goal of this section is to identify the major factors responsible for employment generation in sericulture sector. Sericulture is a vast sector and, therefore, before identifying the employment generating factors, the dynamism of the sector needs to be explained. Silkworm rearing and mulberry leaf growing are the essential components of work through which involvement of family workers and wage workers takes place. It has often been observed that the hectare of land cultivated for mulberry determine the level of raw silk production and hence it can be assumed as an influencing factor of employment generation in sericulture sector. Farmers, on the other hand, buy silkworm eggs (known as 'seed') either from private graineurs (licensed seed producers) or state grainages. It has been observed that in India, farmers are more dependent on private entrepreneurs for seed. Thus graineurs are crucial link in the production chain. The granieurs sell their seeds mainly to individual farmers, but sometimes they also sell these to brokers and reelers, who purchase in bulk for distribution among the clients. Thus, affluent middlemen are often observed to occupy a dominant position in the rural sericulture markets and, therefore, employments as well as production jointly become dependent variables on their level of activities. From supplying rearing trays (known as '*chandrikas*') to providing capital for constructing rearing houses, their involvement becomes dominant in all sphere of activities attached with sericulture.

After rearing comes the successive stages of production, i.e., reeling and spinning for silk yarn production. Reelers buy the silk yarn form the cocoon-market where the rearing farmers gather to sell their cocoons. The reeler's business is to unwind silk from the cocoons and amalgamate a number of filaments to form bells of yarn of desired thickness. This is done either on locally built simple machines (e.g., filature, charka) which produce a rough grade of yarn or on more complex machine and costly factory made machinery producing a superior quality. At one extreme, there are poor men running charka or cottage basin with family labour and, on the other , there exists wealthy rural merchant-run fifteen or more of the Multiend Machines drawing labour from the poor rural community. This production of silk is of higher quality and have a greater market for further transaction. Reeling units in this way may influence the level of employment generated in reeling sector.

Reelers sell out their silk yarn to weavers, who can again be classified into two types, besides independent weaver: (1) those who undertake weaving only (who comprise societies and the local private silk merchants); (2) those who own reeling units and also put out work to domestic weavers (who comprise the society). Hand-looms and power-looms are used as weaving equipment, depending upon the nature of financial as well as entrepreneurial capacity of the weaving firms. Hand-looms produce comparatively inferior grade of silk thread with higher level of thickness. Hand-loom production is less cost intensive which the poor rural artisans prefer to choose. Therefore, higher levels of employment generation are usually associated with hand-looms. In contrast, power-looms produce quality silk, but the labour saving method of production curtails the scope of employment generation.

7.3.2 Employment Boosting Model of Artisanal Silk Production

Employment aspect of the sericulture has essentially been dealt with by the Planning Commission and every year certain targets for both employment and output are fixed accordingly. An upward trend (see Figure 7.3) for all levels of employment generation by all types of silk production in India has been observed. On the basis of the available statistical data on production, employment and hectare utilization for mulberry cultivation a regression analysis of employment in artisanal silk sector on production, area, labour productivity and output elasticity of employment is undertaken here. Running OLS on the available data a model has been constructed for which the regression coefficients are explained below.

Table 7.2(a) Employment Generation Model in Indian Sericulture

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	d.f1	df2	Sig. F Change
1	.990	.980	.973	1.00003	.980	146.870	4	12	0.000

a Predictors: (Constant), Labour Productivity, Area of Mulberry Cultivation, Output Elasticity of Employment , Production of Raw Silk;
b Dependent Variable: Employment in Sericulture

Table 7.2(b) ANOVA of Employment Generation Model

Model		Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	587.514	4	146.878	146.870	0.000
	Residual	12.001	12	1.000		
	Total	599.514	16			

a Predictors: (Constant), Labour Productivity, Area of Mulberry Cultivation, Output Elasticity of Employment , Production of Raw Silk;
b Dependent Variable: Employment in Sericulture

The ANOVA exercise shows that "F" statistic in the model is significant, which ensures that the model is an appropriate fit and since the Durbin-Watson statistic = 1.961, it ensures that serial auto-correlation is virtually absent in the model. The Adjusted R^2 = 0.973, i.e. 97 percent of the data variation of the dependent variable (i.e., employment) is explained by that of the explanatory variables chosen for the model. The estimated regression equation is given by (estimated standard errors are given in the parenthesis):

Employment = 53.596 + 0.004 * (production) – 24.43 * (labour productivity)
(4.131) (0.00) (2.012)

(** 0.01 level of significance and *0.05 level of significance)

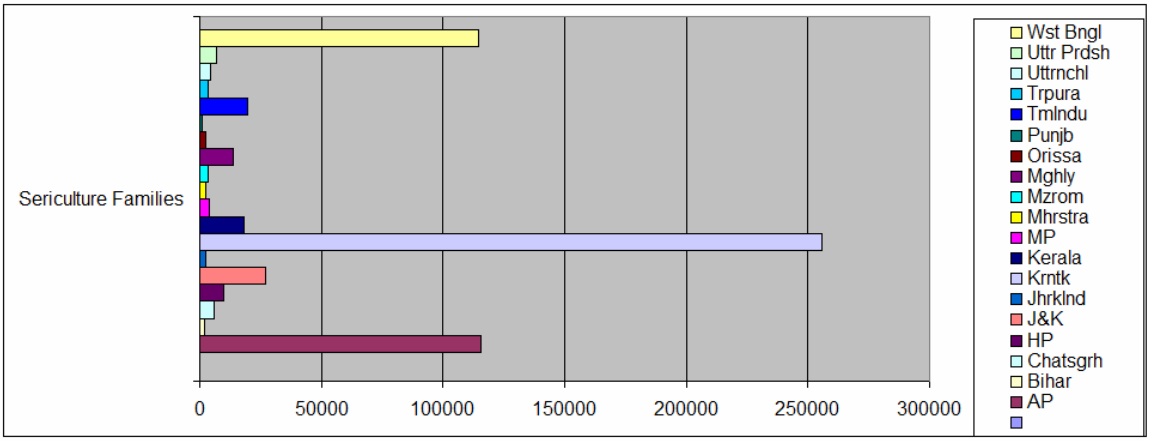
Low value of the standard error of the estimated coefficients suggests good specificity of the model. The proposed model shows that production and labour productivity are the significant explanatory factors so far as employment generation is concerned. The regression coefficient 0.004 of production indicates that for rise in one metric ton of raw-silk production, 0.004 lakh, i.e., 400units of employment will be created in the artisanal silk sector. The next significant regression coefficient is – 24.43 of labour productivity, which implies that if each person employed in sericulture is capable of producing an extra one unit of raw-silk, then there would be a substantial gross reduction in total employment by 24 lakh persons in the country. This can be justified with common logic as productive labour force actually declines the demand for further labour and that causes fall in level of employment.

The magnitudes of the other non-significant explanatory factors i.e., area and output elasticity of employment are positive and negative, respectively. Increase in area of mulberry cultivation raises the level of employment, but the rise in output elasticity of employment reduces the level of employment, which can again be logically explained. Output elasticity of employment rises with rise in labour productivity, and thus the inverse relation can be rationalized.

7.3.3 A Cross-section Model of employment generation in Indian sericulture

A study of state level data on sericulture statistics (2003) will bring to light the interstate variations in different sericulture parameters. Sericulture employment is significant in five traditional states, namely Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu and Jammu & Kashmir. Besides these five traditional states, sericulture is also providing employment to some extent in the states of Kerala, Meghalaya and Himachal Pradesh. Department of Sericulture is trying to expand its arena beyond the traditional states, but its impact is yet to be realized and variation in level of employment is an indicator of that. Differences are there at the level of institutional facilities, finance, at market structure and so on. However, favourable climate and presence of generations of an artisan class constitute comparative advantage of these traditional silk producing states. Accordingly, an attempt is being made to identify factors influencing employment in sericulture in this section.

Fig 7.7 State Level Employment Situation in Sericulture (2003)
(Number of Sericulture *Families)*

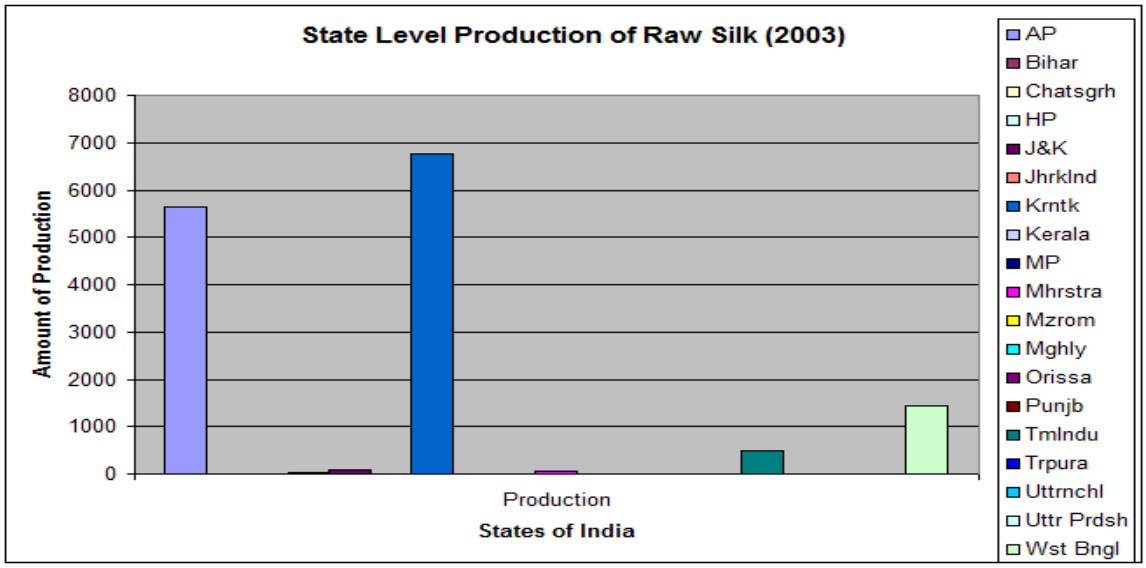


According to previous hypotheses, the factors expected to play significant role in influencing the level of employment in the sericulture sector are briefly summarized with some justifications:

- Raw Silk production: As production of raw silk increases, the level of employment is expected to rise. However, few levels of disparities are observed in this causal relation between level of production and employment between traditional and non-traditional states.
- Area: Higher area under cultivation refers to higher degree of mulberry production which, in turn, means higher silk production. In reality, there exists a strong correlation between production of raw silk and area of mulberry cultivation. Therefore, in order to avoid the problem of multi-collinearity, some precautions need to be adopted.
- Village: As sericulture is practiced in more and more villages, greater amount of employment generation is expected. This hypothesis has to be confirmed from the available data set. But again the impact of this variable is supposed to be captured by the production of raw silk.
- Grainage: Grainages are the centers where the silkworm eggs are produced by cross breeding using the latest technology. Higher number of grainages implies higher production and higher employment.
- Technical Service Centre (TSC): These centers provide technical facilities to the artisans. It helps in spreading technological innovations.
- Chawki Rearing Centre (CRC): These centers are the ones where rearing of young age larvae is conducted by trained technicians. This is an institutional facility provided with the requisite equipment for maintaining the optimum temperature and humidity. Mulberry leaf required for the young silkworm is obtained from a well maintained garden so that quality of the leaf is ensured. This CRC also raises the amount of silk production and thereby raising employment generating capacity of sericulture.
- Cocoon Market: The farmers harvest the cocoon and bring the same to government-cocoon markets for selling their produce. All the farmers are expected to have the updated information about the seed purchase and information for the purpose of further reference by the market while testing the cocoon for fixing the floor price based on the cocoon. When the farmers arrive at the market they are given a lot number and for every lot they offer bidding price. The raw silk producers (reelers) also come to the market for purchasing the

cocoon from sericulture-farmers. These reelers are also registered as raw silk producers. When the reelers arrive at the market and are desirous of participating in the bidding, they are required to pay some advance to the cocoon market before participating in the bidding. A well organized cocoon market always indicates large amount of cocoon exchange and higher amount of silk production thereof. In a way it also implies generation of higher employability in the sericulture sector.

Fig 7.8 State Level Production of Raw Silk (2003)



- Hand-looms: These are traditional ways of weaving silk. It mainly represents a cottage industry, giving scope to large numbers of poor unskilled silk artisans for earning livelihood. Therefore, number of hand-looms is often considered as determinant factor of employment.
- Power-looms: These are modern and also represent the same weaving section as handlooms. Power looms are labour saving and skill intensive compared to handlooms. The impact of powerlooms on sericulture employment would be an interesting point to note.
- Co-operative Societies: Cooperatives are institutional agency for providing credit to the poor sericulture artisans, as well as to help in selling the silk product. Higher number of co-operative societies is expected to raise the amount of production as well as number of employment in the sector.
- Cottage Basin, Charka, and Multiend Reeling Machines: These are the three reeling devices of extracting silk filament from cocoons. The sericulture farms often opt for an individual or combination of these machines to extract a single thread of silk with desired denier. The efficiency of the extracted silk depends upon the number of ends of the cocoon filaments it can combine to form a single thread. Multiend reeling machine is assumed to be a superior reeling devise as it can combine 10 ends against 6 ends in the cottage basin.

  Charka is, however, the most used reeling devise used through out the country. But, due to its technological inadequacies, quality silk can not be produced by Charka. The main reason why charka is still dominating is that bulk of raw silk produced in this

country is used by handloom sector where the cost factor of raw material has to be kept low. Besides, poor quality cocoon can be well reeled economically by charka.

The available cross-section data related to sericulture activities reveal a skewed distribution of all the parameters due to a substantial level of regional imbalance. In order to nullify this effect, an OLS regression with the log transformation of the variables is attempted here. After making necessary adjustments and then running a regression on "sericulture families" (i.e., a proxy parameter of employment), we test alternative model specifications. After eliminating a range of variables due to multicollinearity, a few significant variables which can explain the variations of the dependent variable is accommodated. Categorizing the three major sectors under sericulture and silk industry, into rearing sector, reeling sector and weaving sector, the following employment equations may be specified taking the associated explanatory factors of each sector. The log models represent the changes in each variable.

Log Models

ln (emp_seri) = c_0 + ln(area_ha) + ln(seri_vill) + ln (grainage) +ln(tsc) + ln(cocn_mkt)...(1)

ln (emp_seri) = c_1 + ln(cotgbasin) + ln (charka) + ln(multiend) …… (2)

ln (emp_seri) = c_2 + ln (handloom) + ln (powerloom) + ln (co-operative society)……. (3)

Table 7.3 Determinants of Sericulture Employment – Regression Results

Silk Sectors	Explanatory Variables	Model-1 (Equation-1)	Model-2 (Equation-2)	Model-3 (Equation-3)
Silk-Rearing Sector-1	ln (area_ha)	2.661(1.622)**		
	ln(seri_vill)	-0.079(0.209)		
	ln (grainage)	0.205(0.41)		
	ln(tsc)	0.02(0.197)		
Silk-Reeling Sector-2	ln(cocoon_mkt)		1.049(0.435)**	
	ln(cotgbasin)		-0.146(0.137)	
	ln(charka)		0.045(0.137)	
	ln(multiend)		0.128(0.161)	
Silk-Weaving Sector-3	ln(handloom)			- 0.098 (0.064)
	ln(powerloom)			0.559 (0.092)**
	ln(co-opsociety)			0.118 (0.087)
	Constant	0.752(0.24)	7.238(0.448)**	6.461(0.265)**
	F ratio	6.33	7.88	19.662
	R^2	0.725	0.693	0.797
	Adj R2	0.611	0.605	0.757

Dependent Variable: Employment of Sericulture Families- Sector- i (i=1,2,3)
(Figures in the parentheses indicate standard errors. ** Sig at .01 level; * Sig at .05 level)

The results of our regression exercise are reported in Table 7.3. Area under mulberry cultivation (area_ha), cocoon market (cocoon_mkt) and power-loom are three significant factors that influence the data variation in sericulture families. From table 7.3, it is seen, that 1% rise in mulberry cultivation area can raise the level of employment of sericulture families by 2.66%. Similarly, rise in employment of sericulture families by 1.05% is possible, if there is rise in cocoon market by 1%. And 1% increase in power-loom can raise the level of employment of sericulture families by 0.56%.

On the other hand, sericulture village, cottage-basin and hand-looms are found to have negative impact on employment of sericulture artisans. The spatial concentration of sericulture activity in each state reinforces that claim. Cottage basin and hand-looms are known to be labour intensive tools used for production of silk yarn and silk cloth respectively. Inverse relation between these age-old outdated implements and family involvement reveals a positive response (though not significant) towards technology driven growth.

7.4 A Case-study on Income & Employment Generation in Artisanal Silk Industry of Malda District, West Bengal

This section will attempt to delve into regional level analysis shifting the focus from national level to state of West Bengal so that location specific variables can be specifically identified and location specific issues can be chiefly addressed and diagnosed. The investigation will be carried out by analysing a cross section field survey data collected from few sericulture rich villages in Malda district. Malda district is noted for raw-silk production in West Bengal producing 75% of the state's raw silk. This is the reason why problems of silk farmers in Malda district solely can represent the artisanal crisis of the whole state. Again in Malda, eighty percent of the sericulture industry is confined to Kaliachak block (especially Kaliachak-I, Kaliachak-II). More than 20,000 acres of land are under mulberry cultivation and more than 60,000 families are directly or indirectly maintaining their livelihood from sericulture. Out of total sericulture farmers, reelers, traders, 80-85 percent belongs to minority community. Women play a vital role in this industry and 60 percent of the workforce belongs to minority community (Deputy Director, Reeling, 2010).

In 2010, Malda produced more than 1200 MT of commercial reeling cocoons, 1200 MT of raw silk and 450 MT of silk-wastes. The average turnover was in the tune of 115-120 crores of rupees per annum. Around ten years before that, i.e., in the year 2001-02 and 2002-03, the sericulture industry in Malda had faced a crisis due to inflow of large amount of high grade silk marketed at a low price. The mulberry cultivation was partly uprooted and 30-40% of mulberry field were planted with mango tree. From the year 2003-04, the industry again started gaining momentum due to increase in silk price. The year 2004-05 has been boon to sericulture industry when price of cocoon ranged from Rs. 80/- to 120/-. A poor farmer having a land of 20-22 decimal of mulberry land have received income of Rs. 3000 to Rs.3500 on an average per season. However, farmers and artisans are still practicing sericulture using rudimentary technology. This results in low productivity. Another important aspect is that though 80 percent of the primary production of sericulture, i.e., commercial cocoons is produced in Malda district, the reelers still procure a sizeable quantum of dry cocoons from Maharashtra and Jammu & Kashmir. The weaving sector in this district has not been developed so far. As a result, the reelers have to look forward to southern states, Benaras and Bhagalpur for the disposal of their processed yarn.

Encroachment of mango orchard is another threat to the sericulture farmers in Malda district. Big farmers with large land-holdings are having a tendency to convert their agriculture land to mango orchard. In 2001-02, twenty per cent of big sericulture farmers in Malda have been found to switch over to mango tree plantation (ibid, 2010). On the other hand, sericulture farmer having a small holding adjacent to mango orchard had no alternative than to plant mango trees in the field because the mulberry bushes were not receiving sunlight because of the shades from the canopy of the adjacent mango trees while the roots proliferation of the big trees along with the detrimental impact of insecticide accelerated the severity of the issue.

This is the way the big farmers and moneylenders of Malda are gradually encroaching the lands of small farmers by creating indirect pressure to convert their lands from mulberry plantation to mango orchard.

Multi crore industrial groups have entered in each and every pocket of sericulture belts and engaged particularly young women sericulture farmer in *beedi*-making industry. Tobacco is detrimental for the natural growth process of silk worm and therefore this also causes retardation of growth of mulberry raw silk in Malda district.

Sericulture sector is being controlled by few rich money lenders. They advance loans to the poor farmers and artisans not only for business purposes but also for consumption purposes. Due to inadequate supply of silkworm eggs from the government, the silk farmers are forced to procure eggs from open market with high price. This necessitates the presence of moneylenders in the absence of other dependable credit providing agency. On the other hand, poor reelers are not getting the market price of their yarn as a vicious cycle of exploitation is continued over seasons. The poor reelers-artisans are always at the mercy of these money-lenders for purchasing dry-cocoons and again for selling the yarn they produce. They are bound to sell the yarn at a lower price to these moneylenders. Money lenders are taking undue advantage of these artisans. It has been observed that nearly 10-12 crores of rupees are getting rolled as capital investment by Mahajans.

For the silk farmers, stability of price of cocoon is required for their own economic security. However, this price drops down when Chinese cocoon gluts the market worsening the situation of these poverty stricken farmers. Though anti-dumping law was imposed, still it enters into the market bypassing the sub-clause and again through different channels. Thus the fortune of the domestic cocoon producer depends on the import restriction as it can hardly withstand this severe under cutting of cocoon prices done by China. The government has on the hand, no stable system of controlling price of cocoons to save the interest of a large impoverished section.

Most of the rearers prefer rearing using cross-breed (CB) seeds. Multivoltine breeds (known as *Nistari)* are also widely popular and reared in Malda. The quality of multivoltine silk thread along with temperature tolerance leads to development of crossbreeds between multivoltine and bivoltine races. Higher filament always rationalizes the choice in favour of bivoltine races but weather condition in Malda does not permit this over sensitive race to sustain due to its low resilience power. Therefore, the cross-breeds take the centre stage and are largely accepted by the peasant-artisanal labourers in silk industry

Table7.4 Comparative Characteristics of Multivoltine & Bivoltine Races

Parameters	Bivoltine	Multivoltine
Egg-type	Diapause/ Non-diapause*	Non-diapause
Disease Resistance	Relatively Poor	Relatively Better
Temperature Tolerance	Absent	Present
Filament Length/ cocoon (m)	1000-1600	400-500
Average Filament denier	2.85	2.1
Reelabilty	91.25	79.3

Source : The Silkworm : Biology, Genetics and Breeding * delay in development in response to adverse environmental condition.

A large number of local breeders having licenses are capable of producing breeds by crossing Nistari females with bi-voltine males, which are quite popular among the locals. The returns are also higher for this race. However, scientific crossing is only viable with the CSB farms. Kaliachak is the single most important marketing hub for these cocoons in the entire district. In the district more than 60,000 families are engaged in silkworm rearing. They are either having separate houses or dwelling cum rearing house. They are usually harvesting five crops in a year for which disinfection of rearing and its all implements before and after each crop remains an emergent criterion. The government advises SHG (Self Help Groups) which can at least provide services to 200 farmers' houses with disinfectant materials. In this way, 4000 mandays can be generated with 30% services and each rearing house can accumulate one lakh income per annum (Deputy Director, Malda, 2005).

Reeling of Silk yarn in Malda is concentrated in Jalalpur under Kaliachak police station (De Sarkar et.al., 2013). However, the prevalent operation system is mostly traditional. The traditional system involves operating country-charkas used manually by hands. The charka basin is made up of brick and cement which is operated with the help of wooden rotating wheel. The cocoons are boiled in water and then reeled. The charka basin can produce 500-600 grams of yarn in 8 hours.

Relatively improved machines, namely Ghosh Machine and Roy Machines are used by co-operatives. It has five units and hence the production is much higher. These machines are used for high yielding varieties of cocoons which can yield silk yarn of uniform thickness and roundness. Filature basin is the most efficient basin out of all. The silk produced by this is of highest quality. The only state owned filature machine is available at Madhughat. The optimum production rate at this filature is about 800-850 grams of silk yarn.

Table 7.5 Progress of Sericulture in Malda District (2004- 2011)

Year	Production of reeling cocoon (MT)			Production of raw-silk (MT)	Production of Silk Waste (MT)
	Multivoltine	Crossvoltine	Bivoltine		
2004-05	6609.14	4948.62	1.30	1274	436
2006-07	4674	7292	-	1202	406
2007-08	3479.9	9702.4	-	1261	419
2008-09	2895	9393.4	-	1327.5	429.6
2009-10	921.1	11669.08	0.85	1357.8	439.29
2010-11	7.0	12675.19	11.25	1359.56	449.18

Source: Deputy Director (Reeling), Malda

7.4.1 Models of Income Generation in Artisanal Silk Industry of West Bengal

This section will deal with the primary survey undertaken in the course of this study. For primary survey certain sericulture rich villages were chosen from Kaliachak Block in Malda district of West Bengal. Raw silk production in Malda district is 75% of the state production and mulberry cultivation in Malda district is mostly localized in Kaliyachak-I and Kaliyachak-II blocks comprising 90% of the total mulberry cultivation area. Kaliyachak-I itself occupies 61% of the total cultivated area under mulberry in the district (See Ali et al., 2008). Twenty percent of total sericulture farmers of the district live in this block (Official Statistics, Deputy Director Malda, 2010). Stratified random sampling has been done to

choose the sericulture rich villages namely, *Gayes Bari, Sujapur, Mothabari, Marupur, Alipur, Sershahi, Feranchak, Joshkabil* from this block. Twenty five to thirty households involved with sericulture activities (mainly rearing and reeling) have been chosen from each village using stratified random sampling. Thus a total of 212 households constituted the sample size of this study. Respondents (who are silk artisans) were randomly chosen from those sericulture rich villages and were asked several questions regarding their livelihood and income generation. On the basis of their response, data was primarily collected and then tabulated. The primary survey was designed on the basis of apriori hypotheses to determine the factors influencing the income level of the sericulture households. To run the regression of annual income earned by the household on several variables on the basis of the hypothesis, OLS method was used using SPSS package. The regression result has been enumerated in Table 7.6.

Table 7.6 Results of Regression

Dependent variable: ln (Income)

Estimated Coefficients	B	T	Sig	VIF
Constant	2.654	5.204	0.000*	1.405
ln(cost of raw materials including implements)	0.712	15.184	0.000*	1.405
ln(loans)	0.037	2.270	0.024**	1.309
Ln(mandays)	0.160	1.711	0.089***	1.120

R^2 = 0.659, Adj R^2 = 0.654, F (df) = 134.51 (208)* ; *** sig at 0.10 level, ** sig at 0.05 level; * sig at 0.01 level;

Interpretation of estimated Parameters

In order to rectify the problems of heteroscedasticity the chosen variables in this model has been transformed into $\log_{naturals}$. The dependent variable Annual Income of sericulture family has also been log transformed, i.e., ln(Income). The chosen log transformed variables are cost of raw materials and implements, loans and mandays. The farmers with higher number of implements and raw materials are always observed to earn greater income. Similarly loan taking farmers are more often found to generate higher income and greater seasonal varities cropped by the farmer-artisans are expected to derive greater annual income. Based on these hypotheses an OLS regression is run on the predictors and the above estimated coefficients have been found.

The significant F statistic ensures the 'goodness of the fit' of the model. Adjusted R^2 indicates that 65 % of the variation in annual income generated by the sericulture family is explained by the assumed explanatory variables. The model is free from problem of heteroscedasticity as all the variables have been log transformed variables. The VIF values of all estimated variables are less than 5, which ensure absence of multicollinearity. From the estimated coefficients one can interpret that one percent change in cost of raw materials (including implements) results in around 0.71% increase in annual income, while similar level of increase in loan amount would increase approximately 0.04% of annual income of the sericulture family. Again if mandays are changed by 1% the annual income will also change by 0.16%.

The rich farmers, who are expected to bear higher production costs, would get higher returns as inferred by this specific model. This finding rejects the traditional claim that sericulture

activities are usually pro-poor. However, as most of the artisan-farmers in West Bengal are loan seekers due to their underprivileged economic backgrounds, the model provides a relief by ensuring that 'loan taking' is also income rewarding, although in a very small proportions. With poor economic background, dependence on loans for survival is common and therefore substantial change in income cannot be expected.

7.4.2 Models of Employment Generation in Artisanal Silk Industry in West Bengal

In this section employment generation models in artisanal silk industry will be built on the basis of primary survey data collected from sericulture rich villages in Malda ditrict. This is expected to enlighten those employment related issues which are specifically sensitive to this region in contrast to the national scenario. These location specific variables can help us to identify location specific problems and then the problem could be easily addressed from policymaker's perspective. The investigation will be initiated with the analysis of a cross section field data collected from the same sericulture rich villages, as we have indicated before, in Malda district of West Bengal.

The following factors have been primarily identified as influencing determinants of average employment generation in a domestic sericulture farm through out the year. The rationale for choosing these factors is also explained below.

- Household Size: It is an influencing factor for determination of level of employment in a particular domestic sericulture farm. Higher the household size, higher is the requirement of income generation as well as higher will be the capacity of potential employment.
- Mulberry Area: Mulberry leaf is food of sericulture worms and therefore higher mulberry area is indicating greater opportunity to raise sericulture and therefore employment level is expected to rise. However, in case of declining market price, there could be conversion of sericulture to other profitable cash crops or food crops which in turn would decrease the level of employment in sericulture farm.
- Years of Schooling by Head of the Family: Years of Educational background may affect the level of employment of sericulture farms. An educated family head may not be willing to employ his offspring in domestic work-activity and not for education attainment, thus resulting in fall in employment levels.
- Male Hired Workers: Hired male workers are important proponent of the level of employment in a sericulture farm. Male hired labour is more cost escalating and therefore rise in this cost signifies the intensity of the domestic farms in this sericulture business.
- Female Hired Workers: As sericulture sector is often known as women labour intensive sector, investigation can be made to test whether numbers of hired female workers have any impact on the total number of employment created in sericulture sector. Female workers are interpreted in numbers and this is a continuous variable.
- Man-days: It refers to the number of working-days created by a particular work. Higher number of man-days offered by a job also makes it more stable, assuring an average return throughout the year. Previous studies showed that sericulture activity offers higher man-days if rearing is practiced through out the year. One can hypothesize that greater level of employment is associated with higher man-days created by the activity.

- Cost of raw materials: When raw materials become dearer the domestic farms try to economize by expanding its activity. Thus the level of employment is expected to be positive with increase in raw materials.

Based on the above hypothesis a linear model has been built ,as following, and regression of 'Employment Level'(i.e., average employment level in a sericulture farm through out the year) will be run on the above explanatory variables.

Employment Generation Model

Employment Level = $\beta_0 + \beta_1$* household-size + β_2 * mulberry-area + β_3 * Years of Schooling by HOF + β_4 * Male_hired-labour + β_5 * Female_hired-labour + β_6 * Mandays + β_7 * Cost_rawmaterials

Ordinary Least Square method has been applied with SPSS package to regress 'Employment Level' on the said explanatory variables. ANOVA table shows us that "F" statistic of the model is significant which explains the goodness of fit of the model. The table also tells us that Adj.R^2 = 0.855, which means that 85.5 percent variations of the dependent variable is explained by the regressors. Observing the pattern of the plot of the 'predicted residuals' and the 'residuals', it has been inferred that no discrete pattern between them exists and that ensures non existence of heteroscedasticity. In the table 7.7(c), the values of VIF (which are all less than 5) ensure that multicollinearity problem does not exist in the model.

Table 7.7 (a): Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Model					R Square Change	F Change	df1	df2	Sig. F Change
1	.927	.860	.855	2.62	.860	177.441	7	203	.000

Table 7.7 (b): ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8521.103	7	1217.300	177.441	.000
	Residual	1392.641	203	6.860		
	Total	9913.744	210			

a Predictors: (Constant), Cost of raw materials, Mulberry area, Female hired-labour , School Education years of Head of the Family, Household Size , Mandays generated, Male hired labour

b Dependent Variable: Employment Level in Domestic Sericulture Farm

Table 7.7(c): Estimated Coefficients

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	3.610	.609		5.928	.000		
Household Size	.339	.055	.179	6.138	.000	.811	1.233
Mulberry area	-5.892E-02	.037	-.043	-1.596	.112	.970	1.031
School Education years of Head of the Family	-9.638E-02	.042	-.063	-2.316	.022	.926	1.079
, Male hired labour	1.071	.056	.645	19.231	.000	.615	1.627
Female hired-labour	.849	.083	.325	10.180	.000	.680	1.471

Mandays generated	-7.232E-03	.003	-.085	-2.627	.009	.659	1.518
Cost of raw materials	1.772E-06	.000	.042	1.344	.180	.721	1.388

[Dependent Variable: Employment Level in Domestic Sericulture Farm]

Interpretation of the Result

From the table of estimated coefficients (table 7.7(c) the following results can be inferred:

If number of households is raised by 10, then the average employment level in a sericulture farm would be raised by 3. Years of schooling by the head of the family discourages the level of employment in a sericulture farm. If school education is raised by 10 years, then the level of employment would decline by one person per farm. Again, addition in male hired labour will raise the average number of employment by one unit through out the year, while a rise in female hired labour does not increase the average level of employment in sericulture farm throughout the year in the same proportion. It has been observed that an increase of 10 female hired workers have the tendency to generate 7 numbers of average employment in a sericulture family. On the contrary, creation of greater man-days ultimately declines the level of average employment of a sericulture farm. If 100 more man-days are created there will be a decline in the level of employment by almost 1 unit (0.7 is rounded off to 1).

Barring the significant regressors, another determinant needs to be mentioned, i.e., mulberry area cultivated by a farm, which bears an inverse relationship with level of employment by a sericulture farm. Addition to mulberry area of cultivation induces the farm to shift his vocation to alternative return generating farm activities.

7.5 Conclusion

In the foregoing sections income generating potential and employment creating abilities in the artisanal silk industry has been discussed specially in the context of the state of West Bengal. The primary survey in sericulture rich villages of Malda district regarding these three issues provides sufficient insight to understand the situation of artisanal silk industry in rural West Bengal. The income generation process in rural sericulture has revealed the dynamism of the process of earning by the rural inhabitants. While in national perspective, area of mulberry cultivation and price of reeling cocoons have been deduced as significant explanatory variables for upward rising slope in the 'income generation curve', the primary analysis in the most sericulture rich district of West Bengal exposes that number of man-days generated from different phases of silk-worm rearing activity actually influence the total income generation, which is very much logically justified. On the other hand, loans taken by the household farms (mostly from *dadani* merchants) and cost of machineries and implements have a positive effect on income generation of the sericulture farms. This in a way establishes that rich farms who are expected to bear higher production cost have greater income generating power from this artisanal silk industry. The rural sericulture oriented villages are inhabited by small farmers with very little capital base and thus this result is barely relevant to them. This may perhaps justify the declining number of sericulture farmers in West Bengal during 2002-03 to 2010-11, which have declined from 110,000 to 92,200 (Ministry of Textiles, Sericulture, 2002-03, 2010-11). However, the results also shows that loan seeking farms can enhance their income, albeit marginally, in sericulture activities which is a sign of hope for a large chunk of artisanal farmers in West Bengal.

In employment perspective, West Bengal has comparatively higher "families involved per village" (48.9 in 2003) compared to other traditional states (Karnataka=13.3, Andhra Pradesh= 14.29). However, the recent statistics explain a declining trend in employment generation especially in the Eleventh Five Year Plan. Although higher levels of labour involvement do not necessarily imply higher level of production always, it does reveal the possibilities of positive spillover effect that creates positive externalities in turn. However, whether the spillover impact would be totally effective that depends on the gender perspective of this income and employment generation. Over the last decade, the growth in sericulture has declined in respect of involvement of villages and families in West Bengal , which is presumably due to primitive infrastructure and foreign competition. The primary survey analysis on Malda reveals that area of mulberry cultivation, educational background of family head and total man-days creation have inverse impact on the level of average employment generation in rural West Bengal. On the other hand, rise in household size and numbers of male and female hired labour have positive impact on the average level of employment generation in a sericulture family farm.

Under the Directorate of Sericulture every year certain targets have been adopted by the planners to augment the level of income and employment in this artisanal silk industry. However, difficulties lie in implementation of the stages. Increase in area of mulberry cultivation is shrinking in West Bengal, which can be considered as one of the major factors for the slow growth of sericulture in West Bengal. Improved mulberry variety is to be planted with greater care for manures and fertilizers. Innovations and technologies need to be directed so that more output can be produced in cost effective ways. Quality yarn needs to be produced by the domestic farms so that Chinese aggressive trade policies can be tackled. Irrigated lands have higher productivities and therefore greater stress should be given on expansion of the irrigation network. Cocoon markets are usually public market, though private cocoon-markets also exist on a wider scale. Enhancement in number of cocoon markets and power-looms can be done with a little effort from the government. Credit facilities to sericulture artisans need to be made at discounted rate so that poor farmers can easily adapt themselves with the rise in costs arising out of inflation trends.

Gender promotion and thereby social transformation along with poverty eradication is another major feature of this artisanal silk sector. The upcoming chapter will elaborate on gender issues in greater details.

Notes

1. This is evident from its highest average number of sericulture families per village i.e., 48.9% while in Karnataka, Andhra Pradesh and Tamil Nadu it is 14.29%, 13.32% and 5.26% respectively (CSB, 2003
2. See Gangopadhyay (2008): Silk Industry in India: A Review Indian Science & Technology; NISTDS, CSIR, New Delhi;
3. See the Keynote Address of Commissioner of Sericulture, Government of India (i.e., "Potential for Participation of Women in Sericulture Sector) delivered on National Conference on "Women in Sericulture" held at Mysore on 16th , 17th March, 200

CHAPTER: 8

An Empirical Analysis on Social & Gender Issues in Artisanal Silk Industry of West Bengal (A Case Study in Malda District)

8.1 Introduction

After an elaborative discussion on income and employment issues in artisanal silk industry of West Bengal, this chapter will focus on gender and social issues related to this sector. The discussion will begin with portraying family dynamics in this household industry followed by raising certain grave issues like child labour involvement in this specific industry. An extensive analysis will be carried out focussing on the role of women workers in the sericulture sector in the final section of this chapter. Sericulture is such an activity where most of the work is performed by women alone in terms of operations performed and time invested. However, despite showing tenacity and persistence, the women workers remain as unpaid family workers or low paid hired workers. This chapter will attempt to explore these hidden issues behind this so-called 'predominance of female workers' in this artisanal sector, especially in the context of West Bengal. This dominance is usually translated into distributive impact, which is also known as 'spillover effect of women employment'. Employment of women raise the nutritional level and educational level of their children irrespective of their sex at a greater level compared to that generated from male employment. Report of the working group on Empowerment of Women for the Tenth Plan (MWCD-GoI, 2006) states that lack of women's employment not only impedes growth and poverty reduction but also welcome a host of negative impacts including less favourable education and health outcomes of children. This prioritizes the core objective of this chapter, i.e., to identify the explanatory factors behind such female dominance in sericulture sector of West Bengal. However, before delving into the core analysis it is very much pertinent to carry on a rigorous analysis on family dynamics and issues of child labour in the context of artisanal silk industry of India.

8.2 Family Dynamics & Role of Gender in Sericulture Households of India

Being labour-intensive and productive household enterprise, sericulture poses a direct impact on the family structure of the artisans. It involves predominantly the family labour. Being a household industry, it naturally facilitates the involvement of womenfolk, to a large extent. Its frequent cash returns have the potentiality of changing the power equations within the family. Thus, adoption of sericulture is bound to disturb the existing structure and the functioning of family for better or worse. In this context, it is useful to look into the dynamics of the family system of the artisans.

Gregory (1997) made an interesting attempt to examine the changing features of Indian family system. He analysed the structural variations and implications in the context of sericulture. His analysis was based on the intra-family dynamics and authority relations along with a detailed analysis of gender relations. According to his sociological view-point, family in Indian society has occupied a central place in carrying over the traditional features of village life in India. For most part, the traditional system has survived for centuries without any major institutional alterations. Precisely, with the advent of British rule and the accompanied factors of industrialization and modernization, the structural features of different traditional institutions of Indian social fabric had started changing. With the passage of time, national liberation and consequently economic policies have further speeded up such changes, directly or indirectly, by various governmental measures initiated in the post-independent era.

Various regional studies have revealed a diversity of patterns in rural family structures (Morrison 1959; Desai 1956; Kapadia 1956). According to Madan (1983), the joint family system is now losing its ground because of increasing population, smallness of holdings, easy communication, education, employment opportunities outside and the emergence of individualistic spirit. Another factor that has a considerable impact on the changing structure of the family system in India is family planning, which has helped to reduce the size of the family considerably. Some studies (Singh, 1970) have

noted a difference in family structure with caste-class variations. Accordingly, the structure of the family among the lower castes is said to be just the opposite of the pattern observed among the upper or intermediate castes. This pattern is related to the significance given to conformity to the traditional family ideal. This is also positively correlated with joint ownership of wealth and property. Moreover, agricultural occupation and land-holding is seen as sustaining the motivation for togetherness among the upper castes. No sufficient land and substantial property are discerned among the lower castes to hold the interest of the members to the joint family norm. As a result, it allows their young to behave more independently and break away from the parental family authority at the slightest provocation.

Sericulture provides a challenging environment to the family system and potential stimulation for alterations in its structure and functioning. Sericulture, by its very nature, has its own characteristic features that necessarily affect the family relations. It necessitates certain interaction-patterns and social responses to fit into the prevailing conditions and for a better deliberation of the activity. For successful and sustaining returns, there needs to be a perfect understanding and high dedication and commitment to the work among the attendees. Most part of the work is carried out within the household premises. So, there is bound to be changing role-allocations and work involvement. All these are naturally expected to be reflected in family dynamics of the social system. The requirements of sericulture activity necessitate naturally certain alteration in the structure of the family.

Roy, Roy Mukherjee and Ghosh (2012) have made a case study on the sericulture sector of Malda district of West Bengal and have shown that joint households have lower employment generating capacity. This justifies why the poor rural artisanal joint-households in the artisanal silk sectors are gradually becoming nuclear in structure. Gregory (1997) observed an interesting case in one of his surveyed village family at Seripura of Tamil Nadu. He observed in one single family which had fallen under its own weight with conflicting interests and differential involvement that it ultimately resulting in four nuclear families, with the unmarried brother left with the parents. This was true of other similar situations too when, for instance, one of the siblings was involved in the farm activity while another had a salaried job. There were also a few cases of lineal extended families engaged in sericulture. In the case of lineal extended families, there seem to be no parties to act with conflicting and self-motivated interests. The father generally takes care of family activities if he is capable of doing it and if there are larger land-holdings and crop diversification, son becomes the main sericulturist while his wife plays the active supporter role in sericulture. Mother becomes an asset in taking care of the household work while extending a passive support to the sericulture activity. Generally, in such type of family, the married son assumes a greater responsibility in the management of the family, especially in the context of sericulture. 'Matrilineal-nuclear' families usually conform to the general distribution of the family types in the village of Tamil Nadu, with a marginal variation, in favour of sericulture.

There are quite a few cases of widowed mothers who are left alone to take care of themselves in Indian agronomy. However, this hardly happens in a sericulture family where an extra female is always an asset. While surveying in the villages of Kaliyachak Block of Malda district, we also observed higher concentration of female labour in sericulture, especially at later phases of the rearing as well as reeling. At the same time, household work continues to be women's inevitable and taken-for granted attribution. So, the presence of an additional family woman becomes an additional advantage for sericulture families. When an extended sericulture family is broken into multiple nuclear families, in such cases, sericulture generally becomes expanded as it is generally adopted by a majority of the newly formed nuclear units in the place of a single extended unit. There are also cases in which, in the process of break-up, even some sericulture-interested persons may have to give it up. There are also instances of families comprising of one of the parents, either widowed or separated along with unmarried children.

Gregory (1997) talked about one such family in Tamil Nadu with a separated woman with children. After a gap of about five years, her husband joined her again. There are also many instances where SC woman-headed households are successfully running sericulture. The story is same for the sericulture families of Jharkhand and Bihar, as explained by Madhabanand Ray, Managing Director of MASUTA

(a tasar yarn producing company situated at Jharkhand). He explained a case of a widow who was sent back to her mother's place and provided with only a house to live with. She was left all alone to earn her livelihood and take care of the education of her child. She started tasar yarn reeling work and ultimately survived and sustained well (Ramesha et al., 2009). In our primary survey areas at Malda district of West Bengal, we have come across with innumerable single and widowed women who are living happily making sericulture as their mainstay of livelihood (Roy and RoyMukherjee, 2014).

Thus, sericulture has been adopted by all types of families but under specific conditions. Moreover, the adoption of sericulture itself tends to alter the structure and functioning of the family. Intra-family dynamics consists of different role statuses within the family. These include the number of adults in the family, their intensity of participation in sericulture. It also concerns authority relations among the recognized dyads that are traditionally involved in unequal power relations. For instance, the number of adults in a family is an important variable in understanding the internal dynamics of family in the context of sericulture. The sericultural adoption and intensity in different family types can be better understood, if this is seen in the context of the number of adult males and females available in the family.

Researchers showed that in families where there are just two adults alone, sericulture leaves much work-stress (Gregory, 2007). In such families, sericultural activities are kept to the minimum. For the same reason, it is hard for large farmers with less number of adults, especially where there are less than two adult males, to adopt sericulture. It is not the case with other households where there are some additional hands, even if they happen to be children, to extend some assistance especially during peak days of rearing. This enhances the uses of Child Labour even within the domestic arena., which will be discussed at length in the subsequent section.

To assess the nature and pattern of sericulture participation, it is important to understand the relationship status of main sericulturists to the head of the family. A main sericulturist is usually the one who would normally initiates steps to adopt sericulture in the household. The exception is among households that have come up following a division from parental family. It is also the main sericulturist who manages the sericulture work. He also usually takes an active part in its operation. Some of the key activities of silkworm rearing like chawki rearing and moult setting, which are believed to require high skill and personal care, are largely attended by main sericulturists.

In India, where traditional stereotypes are still persisting, subordination of the individual has been considered to be one of the characteristic features of this family (Desai 1984). In such a family system, the individual interests have been subjected to the tenets of the family and of the caste. The head of the family always possess the authority over every individual member of the family. Traditionally, authority rests with the older men of the caste and the man, as husband and father, has head-of-household rights (Hollway, 1994). The dominance of men over women and of the old over the young has been accepted as a norm over time and gradually become institutionalized. The cohesiveness of the family has still been given supreme importance. Though with changing circumstances, there has been a tendency for alteration in authority relations due to many factors, which, in turn, result in structural modifications. One of the major factors that operate in the loosening of such relations is the exposure of the individual members to the external world. The other major factor could be the increasing possibility of exercising or asserting one's control over income. Operation of an enterprise like sericulture requires wider linkages and involves wider exposure. This is because of its dependency on market forces, for procurement of layings and marketing of cocoons.

'Authority' necessarily involves two essential categories of people, namely, the dominant and the dominated, the powerful and the powerless. Authority, control, power and autonomy are all related concepts. Lipman-Blumen (1994) defines power as a set of processes whereby one party (be it an individual, group, institution, or state) can gain and maintain the capacity to improve its will repeatedly upon another, despite any opposition, by its potential to contribute or withhold economic resources from the central task, as well as by offering or withholding rewards, or by threatening or invoking punishment. Here, the emphasis has been laid on the processes and on the critical resources.

In the context of gender autonomy, Mencher (1989) and Leacock (1978) defined 'autonomy' as the extent to which women hold decision making power over their own lives and activities comparable to the power men hold over their lives. Thus, authority basically implies the power to control resources and allocate the same at will and thereby deprive the autonomy of the others to be at their will. Authority is a relative concept. It implies two dimensions, reflecting the stand-points of the powerful and the powerless. The one relates to the extent of control, the dominant exercises over the dominated. The other is related to the extent of freedom the subservient enjoys. The extreme of control and total deprivation of freedom would be the result of a concentrated authority. The more one is able to partake in the control of the resources, the greater would be the devolution of power, which would consequently result in distributive authority**.** This process of transition neither occurs automatically nor voluntarily. It occurs only when it is accompanied by certain other processes that relate to the dominated. In the context of family, the members should undergo first a process of self-realisation about the individual's productive contribution that forms part of the collective resources of the family. This realisation is easily achieved when the contribution is economic and visible. Such a self-realisation instills a self-confidence in them, which is essential in the process of self-assertion. Once this is complete, the so-far subjected individual begins to assert his/her freedom in the areas of decision-making and social behaviour. In such a situation, either the stability of the system itself is threatened or the 'subjected', if failed to achieve the intended freedom, would lose interest in the generation of productive resources, which the dominant may dislike. Thus, the authority-holder is forced to yield to the demands of the subjected individual as the processes of decontrolling and controlling of resources occur simultaneously. In the process, the powerless become empowered, notwithstanding the extent of empowerment.

Sericulture becomes an effective tool in the hands of the subordinates within the familial situation. A majority of the heads in sericulture households, who are traditional authority holders, are either main sericulturists themselves or playing active role in sericulture. In such cases, though they may not feel the pressure to transfer the authority, they are rather more likely to exercise the distributive authority. The extent of distribution would again depend on the nature of support from other participants, which is also crucial to the success of the enterprise. As usually seen the sons in these households are in an unenviable position, either as main sericulturists or active sericulturists or employed outside. Moreover, in about less than fifty percent of the sericulture households in India, wives play an active role in sericulture. So, authority relations are seriously altered in these households. The husband-wife dyad is present in almost all the sericulturist families. Moreover, this is the only dyadic relationship of authority relations found in sericulture households. The relaxation of traditional authority among the dyads mainly depends on the processes along the extent of sericulture involvement and participation. Sericulture being an enterprising and a challenging agro-industry with a high productive potentiality, it becomes a more suitable activity for the youngsters. Prevalence of child labour is a very common phenomenon in all most all the study villages in Malda district. Sericulture, being a household industry, also provides greater opportunity for women to increasingly involve in the operation of such productive enterprises. This too is evident in the study villages, as there is definitely a higher participation of women (as compared to their participation in other agricultural operations). Their participation is still intensive in households with more than one woman and among small and marginal landholders. All these are not without their impact on the social and authority relations. In the succeeding sections, we will try to explore the reasons of predominance of women workers in sericulture activities. But before exploring the gender dominance and gender empowerment through sericulture operations, we intend to discuss the issues of child labour in artisanal silk industry, which is unambiguously a major concern for the policy makers of our country.

8.3 Child Labour Issues in Indian Artisanal Silk Industry

Indian artisanal silk Industry is such an employment generating household sector where instances of both child labour and bonded labour are prevalent. Maximum amount of work of this artisanal industry is carried out by the children, who are employed in all stages of the silk

processing, making sericulture a child-based industry. Child labour, other than being a curse, curbed the possibility of Indian silk exports in the foreign market. In international arena, Germany reacted out to this social clause and proposed certification schemes that would satisfy the customers where no child labour has been used in the producing market. Given the fact that Germany is the largest consumer of Indian silk, this ban on the product which used 'child labour' in its process of manufacturing caused deep concern both to the Indian silk exporters as well as policy makers.

In India, the machines utilised in this artisanal silk sector are designed in such a manner that children can work on them. In sericulture sector, the children are subject to exploitation - being denied to realize their potential and denied of their fundamental rights, like, Right to Education (which has become an Act in India, since 2010), Right to exist etc. This artisanal silk sector has witnessed a progressive and systematic marginalization of the poor during the last few decades. This situation has led to a total decadence of the social and cultural life of the people in this sector wherein, the children find themselves alienated from the social mainstream. The administrative structures, institutional machinery and attitude of the Government continues to overlook the problems, while the artisanal silk industry works at the cost of the health, education, and social opportunities of children. The gross violation of children's rights with regard to their health, social life, education and their lost childhood should be a matter of great concern for policy makers, economists, employers, voluntary organizations and other community members. The Central and State governments and agencies that fund sericulture development in India (e.g., World Bank, Swiss Development Council etc.) has also addressed the use of child labour in Indian silk producing sectors (Menon, 2001).

Artisanal silk sector consists of two important stages in the processing of silk, namely silk reeling and silk twisting. The third stage of production, namely weaving rarely involves child labour (Karnath et al., 2008). However, through a report of World Bank, it has been intimated that bonded child labour is prevailing at all stages of operation in India, like, reeling the silk fibers from the cocoons, fibers from the cocoons, twisting the fibers into thread, dyeing the silk, preparing the looms for weaving, weaving itself and assisting the masters with the complex work of weaving. According to another report, within the vertical structure of Indian artisanal silk industry child labour assists at the bottom to the master weaver. Besides that, the agricultural side, i.e., rearing of silk worms and growing mulberry also involves child labour. They are largely found as domestic unpaid child labour, and often as bonded agricultural child labour (Karnath et al., 2008). No agency, in the government sector or the private sector, has compiled statistics of child labour in various segments of silk industry as a whole. The Karnataka Human Development Report, 1999, quoting from a study conducted by Human Rights Watch, estimated that out of the 400,000 persons employed in the rearing of silk worms and production of silk thread, around 100,000 are children. Child labour under the condition of bondage is widespread in twisting sector.

Bonded labour is a situation arising from a pledge by a debtor of his or her personal services or those of someone under his or her control as security for a debt. Those in bonded labour find it often impossible to extricate themselves from their situation, and may be trapped indefinitely. Many children are given as a collateral for a loan by their parents and become trapped in bonded labour (IPEC 2004: 187). Bonded child labour occurs in more or less the same way as persons get bonded in agriculture. A parent borrows some money towards any expense that she/ he has to incur, in return she/he may enlist the services of a child to work in the production unit (silk reeling or silk twisting 'factory').

In a study among a sample of child labourers in silk reeling and twisting units, (See, Karanth and Vijayalakshmi 1998) in Karnataka, it was reported that the ratios of adult to child workers were 1:3 in reeling and 1:4 in silk twisting. Thus the tendency to depend on child labour was found to be much higher in the silk twisting units than in reeling units. The point to be noted in both, however, is parents indulge in enrolling their children, usually the females, as workers mainly with a view to raise hard-to-mobilise credit to meet a short-term need. Such needs may range from having to meet a contingent medical expense or raising capital for investment such as buying a house site or bribe their way through obtaining a government grant. Girl children worked in silk industry household in large proportions both in silk reeling and silk twisting segments of production (see, Charsley 1998; Karanth and Vijayalakshmi 1998).

There is, however, a tendency for scholars studying the problem of child labour, especially of the bonded kind, to focus on either of the dimensions: the household or the factories in which they are engaged. Likewise, there has been a tendency also to examine the effects of the state initiated measures almost in isolation of the changes that may be taking place in the very organisation of production that enables continued recruitment of child labour on changing terms. For instance, the industry in respect of silk twisting has undergone considerable changes over the years, not many of which are necessarily conducive to hiring child labour. Over the years there has been an increased and intensive activism by the voluntary organisations and similar other civil society institutions campaigning against child labour. Likewise, there have been much more intensive efforts by the state agencies to detect the incidence of child labour employment. Discussions with employers reveal several means with which they are able to revamp their endeavours.

Circumstances conducive for enrollment of child labour in the process of production are not necessarily uniform in both the sectors within sericulture, such as reeling and twisting. Karanth and Vijayalakshmi (1998) had found that 69 per cent parents of bonded child workers too had engaged themselves in the silk industry as wage earners. In contrast, an equivalent proportion of parents of children in twisting sector had been agriculturists, as either small and marginal farmers or wage labourers. Availability of labour, alternative means of livelihood, specific determinants of poverty among the workforce in rural and urban areas, therefore, become important in examining the occurrence of bonded child labour.

With the growing awareness of the concept of child rights, and proactive measures by the state besides concerted efforts of voluntary organizations to eradicate child labour, there have been considerable changes in the social and economic environment within which labour recruitment takes place. While on the one hand there has been efforts to encourage children from poorer sections to enroll in schools (educational and skill improvement programmes), there have also been efforts to mobilize savings and credit through self help groups among the vulnerable groups. The latter in particular has not only acted to provide the economic relief by way of cheap credit, they have also provided a social platform to advocate socially relevant issues such as campaign against child labour.

The industry too has not remained stagnant. Over the years, especially under the spell of economic reforms and liberalised market policies, silk industry has experienced considerable changes, some of which are not well received by those engaged in silk reeling and twisting sectors. Initially some of these measures were seen as welcome changes in the industry, but in due course the small-scale entrepreneurs found them to be taxing. For instance, the job

work that was undertaken in the reeling and twisting sectors were replaced by the entrepreneurs having to purchase the 'raw material', process them and sell the finished value added product in the designated market. Consequently, capital investment especially to purchase the raw material became a big challenge to the poverty stricken silk reelers and the twisting ‘factory’ owners. Workers began to experience fluctuating demand for their services during the mid 1980s and early 1990s. Even though they may have borrowed money in advance as wages from the employers, there was no certainty that they have assured employment. Consequently, there had begun a practice of workers bonding themselves to multiple set of employers, and if one of them had wanted the services of employees exclusively, she /he had to advance afresh the sum over and above what have been borrowed by the workers from another employer.

Demand for silk too underwent considerable fluctuation, especially in the light of import of raw silk from China, which was found to be much cheaper than indigenously produced silk. This affected adversely both the silk reelers and twisters, and in turn affected the wage conditions for the labourers and thus ultimately bonded child labour persisted. In other words, despite the efforts by the state and voluntary sector on the one hand, and adverse market conditions, the institution of bonded child labour continued to exist, if not flourish. Coupled with this continued trend was the near downfall of the state institutions in regulating the market. There are allegations of rampant nexus between the bureaucracy at the regulated markets and the established entrepreneurs who together violate the norms of transactions. Consequently, several feudal and semi-feudal relations of production continued to persist. It was reported that the 'merchants' continue to supply raw material on a job-work basis both to the silk reelers and twisters. During 2003, the amount allowed as wages was reduced by about 30 per cent. This reduction has been passed on to the workers rather than owning up by the job-working entrepreneurs. Workers faced temporary unemployment for indeterminate time-periods. Sometimes they were bound to work at reduced wages and also they have their children bonded so as to raise sums of money that they cannot raise as credit otherwise. A typical 'advance' for a novice child worker consists of Rs. 5000 to 15,000 in silk reeling, while it is much less in the case of twisting. Because the child worker is new to work, the first couple of months of work is unpaid, the duration being considered as 'training.' On the days that the employer has no work to be carried out either due to unavailability of raw material, or power shut down, the worker has now work and therefore no wages. Having been under bondage, however, the child labourer is not free to undertake any other work, for neither is certain as to when there is likely to be a call for their services from the master. The situation, therefore, reflects a form of labour which Daniel Thorner described in the mid 1960s as ‘ Beck and Call’labour. Case studies presented in recent research on bonded child labour describe the conditions involving them having to work as domestic servants when there is no work in silk twisting or reeling (Perodi and Jandhyala 2002; Chamaraj 1999).

Work-conditions and consequent health hazards in silk reeling and twisting sectors make the situation of the artisanal silk sector more precarious. The tender skin of the child silk reelers gets blistered and infected as a consequence of the constant immersion of cocoon in scalding water. In addition to the skin ailments, reelers frequently suffer from respiratory problems, caused by constant inhaling of sericin vapor. The child-workers in the silk twisting factories often suffer from backache and leg pain as they have to stand all day long without any rest. Some of them have found to develop leg deformities even. Cases have been found where boys and girls mentioned about their occasional injuries, mainly cuts from machines (Human Rights Watch, 1996). The rooms are often damp and poorly ventilated; children sit with their legs tucked under them or dangling down into the pit beneath the loom. Contagious diseases,

especially tuberculosis and digestive disorders, spread easily in the crowded rooms. Poor lighting and constant visual strain damages the eyesight. The fine silk threads cut the fingers, and the cuts are difficult to heal properly.

Besides these, abuses common to other bonded industries are found in silk production as well, which includes verbal abuse like threats and harsh language, physical abuse in the form of blows for arriving late, working slowly, or annoying the employer and physical abuse by denying the children adequate rest and recovery time. Girl child workers experience sexual abuse from their employees. Human Rights Watch (1996) reported that girls are preferred by owners because they are believed to be more obedient, docile and submissive. According to the activists and investigators in the area, girl child workers are frequently targeted by the owners inside the factories. The practice is so prevalent that the girls ultimately become recluse from the society due to this stigma of getting assaulted by the silk factory owners.

According to Human Rights Watch Reports (HRW, 1996), an estimated 1 lakh labour involved out of 4 lakh labour were child labours in Karnataka, which is the largest silk yarn producing state in India. Reeling is the process by which the silk filaments are pulled off the cocoon. The cocoons are cooked in boiling water in order to loosen the Sericin, a natural substance holding the filaments together. More than 80 percent of the silk reelers are under twenty years of age, with most of them between ten and fifteen years. The myth of children having natural advantages and skills is used to justify the exploitation of young girls and boys in dangerous work. The myth is perpetuated not only by the employers but also by the educated elite of the society (ibid, 1996). The children are not permitted to use spoons and instead of their hands when checking the boiling cocoons, as they believe that tender hands can more easily discern when the threads are ready to reel. These child-labourers are easily recognizable due to their palms and fingers filled with tracks of burns, scars, burns and blisters.

Silk twisting is another process where individual silk threads are twisted into a strong multiplies thread. Twisting usually takes place in small factories which use bonded child labour in large extent. Team of Human Rights Watch estimated 8 thousand child labour in one hundred twisting factories in one single subdivision of a district in Karnataka (HRW, 1996). The children tend to spindle, fitting them with thread, correcting deviations and performing other routine tasks. Many of the factories were found by the HRW team as shabby and dark with closed windows and shut-doors. The child-workers, who are recruited from all the villages in the area, travel an average of twelve kilometers to the factories where they work. The work is difficult for them and takes along day duration to finish their task. They often face beatings and scolding due to their negligence and after being adult when they are entitled to get higher wages, according to the minimum wage legislation act, the employer fired them.

Silk handlooms are found in the states of Karnataka, Uttar Pradesh, Bihar, Andhra Pradesh, West Bengal, Orissa, Assam, Madhya Pradesh, Jammu & Kashmir and Maharashtra. Evidences of bonded child labourers have been found in those silk handloom industries of Kanchipuram at Karnataka and Varanasi at Uttar Pradesh. In Kanchipuram, 40,000 to 50,000 children work in bondage while in Varanasi 85,000 child-workers have been found as working under the assistance of adult master weavers. They stretch the warps for the looms and fit the bobbins in the shuttles in preparation for the actual weaving. They sit beside the master weavers all day long, helping to lift the warp threads and manually feed the weft threads for the intricate designs of the silk saris. Children commonly enter the hand weaving

industry between the ages of six to nine and continue to work in that occupation through out their lives. Sometimes, their entire families are bonded, while set of siblings were found to be bonded somewhere else. These ill-fated artisans do not know even when their servitude would end.

Human Rights Watch prepared its reports on Indian silk industry in 1996 and 2003 consecutively, because the sector has received relatively less attention by the NHRC (National Human Rights Commission) and the international community other than industries such as handwoven carpets as it has an export market prospect. At every stage of the silk industry starting from boiling cocoons, hauling baskets of mulberry leaves, to embroidering saris, children are working everywhere. During 2003, it has been found that more than 3.5 lakh children are producing silk thread and helping to weave saris. These stages are most reliant on bonded children. The children work twelve or more hours a day, six and a half or seven days a week, under conditions of physical and verbal abuse. Starting as young as age five, they earn from nothing at all to around Rs. 400 a month, some or all of which is deducted against loans ranging from around Rs. 1,000 to 10,000 (HRW, 2013).

Both boys and girls are bonded in the silk industry. However, girls' work tends to be less visible. Girls, especially in Muslim families, may have the work brought to them in their homes instead of going out to work; this places them outside the protection of the child labor law. Girls typically perform household labor in addition to income-generating work; household labor is typically not shared by boys and is often not considered to be work at all. Where girls do go out to work, as in Karnataka, they are more likely to remain lower-paid assistants, less likely to become weavers. Girls are also less likely to be sent to school and may be less likely to access remedial programs, such as night schools, that do not take into account additional barriers including limitations on their ability to travel at night or for long distances to reach a school. Abuses against girls, including sexual abuse by employers, are noted throughout the report of Human Research Watch (HRW, 2003).

In 2003, Human Rights Watch's investigation covered three states prominent in the silk industry. In the northern state of Uttar Pradesh, most attention has been paid to child labor in the carpet industry, but the limited attention to silk has pushed the child labor that was in factories into individual homes. In Tamil Nadu in the south, which has identified more bonded laborers than any other state, the state government has simply abandoned the Supreme Court's rehabilitative framework for any children found working in hazardous occupations after 1997, in clear violation of the Court's order. In Kanchipuram, a major silk sari weaving area in Tamil Nadu, child bondage is open, and the district collector, instead of prosecuting employers, has opened night schools for working children. In the southern state of Karnataka, silk thread production still depends almost entirely on bonded children. The state government has promulgated a plan to eliminate all child labor; this plan was not in operation at the time of Human Rights Watch's investigation.

One of the foundations of bonded labor is the caste system, through which a traditional expectation of free labor, lack of land, and the threat of violence and social and economic boycotts from upper castes conspire to keep many so-called untouchables, or Dalits, in bondage and a perpetual state of poverty[5]. While education and poverty-reduction programs are extremely important, if the caste aspects of bonded labor are not addressed, these programs will not change the actual power dynamics and economic relationships that perpetuate bonded labor in artisanal silk industry of India.

Indian laws prohibit the use of bonded child labor including debt bondage, child servitude, and forced labor. As per constitution, the government of India is obliged to take affirmative actions protecting children from economic exploitation and hazardous work especially for their tender age. Bonded child labor is also specifically identified as among the "worst forms of child labour" by ILO Convention No. 182 concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, which India has not ratified. Indian law has long prohibited bonded labor, and regulated and restricted child labor up to age fourteen. However, the practice of child labour as well as child-slavery is still continuing within its social fabrics[6] without any hidden manner. This practice of bonded child labor violates various provisions of Indian law too. Labor by children under age fourteen in industries deemed hazardous, including all aspects of the silk industry, is expressly forbidden. Since the Indian Supreme Court's December 1996 decision in M.C. Mehta v. State of Tamil Nadu & Others., states have been obligated to identify children employed illegally, including those in work the Child Labour Act deems as "hazardous" and prohibits entirely; to remove the children, fine the employer Rs. 20,000 and deposit the fines in a rehabilitation-cum-welfare fund; to use the income from the fund to rehabilitate the child; to either employ an adult family member or contribute an additional Rs. 5,000 to the fund; and to prosecute employers. The Court ordered the Ministry of Labour to monitor the M.C. Mehta decision's implementation.

This report is not meant to be an exhaustive survey of all bonded child labor or implementation of the law in all of India. Rather, it is based on field investigations of bonded child labor in the silk industry in three states: Uttar Pradesh, Tamil Nadu, and Karnataka. Human Rights Watch chose these three states because they are major silk thread and sari producing areas, they illustrate varied involvement of the National Human Rights Commission, and they are geographically diverse. While the report focuses on silk, it could have been written about any number of industries. Additional research could also be conducted on progress made by states with higher literacy rates and lower use of bonded child labor, such as Kerala, and NGO initiatives such as the M. Venkatarangaiya Foundation in Andhra Pradesh.

However, Human Rights Watch conducted research and prepared a report on child labour involvement in artisanal silk industry along with other industries during March to April 2002. During their course of investigation, they interviwed 155 people, including fifty-four children, as well as teachers, parents, loom owners, traders, activists, academics, lawyers, and government officials at the district, state, and national levels. The youngest bonded child whom they interviewed was seven years old; and, children reported that they began work as young as age five. Almost all non-Muslim bonded children whom they interviewed belonged to Dalit and low-caste communities. As a whole, they found a very small change in elimination of child labour has taken place within 1996-2003 in Indian artisanal silk industry.

According to ILO statistics (2007), prevalence of child-labour is the largest at Malda district in West Bengal, which is also famous for artisanal silk industry in the state (Roy and Barman, 2012). From our own field surveys in several villages of Kaliachak blocks of Malda district, we observed widespread presence of child workers in the artisanal silk manufacturing households. These children are being used by their parents in the domestic silk manufacturing work. Although dropout children are not a very common phenomenon within the households, but lots of girl children spend their own time by sharing domestic work with their parents without attending school classes. As sericulture is mostly concentrated within the minority

blocks of Malda district, sending the girl children outside the domestic periphery is not a very acceptable phenomenon. But silk production definitely involves works of these children within the domestic arena. The following sections will explore the reasons behind the predominance of women workers in this particular vocation and whether their quantitative dominance is enhancing their empowerment in true sense.

8.4 Women workers in Indian Artisanal Silk Sector

Sericulture is practiced in villages of India as family-based occupation and thereby provides women a major role to play with in various activities of this household-industry. Nearly 60% of the labour requirement is met by the women (Acharya, 1993) in almost all the traditional sericulture agencies (Sandhya Rani, 2006) in the world. Here, by sericulture agencies we mean the nature of production organization, whether it is a small household unit or large corporate organization. Women's precision and patience make their presence more invincible in silk-worm handling. Since traditions and customs of society in Indian rural context do not encourage the majority of rural women to work outdoors, sericulture proves to be a boon. It gives a wide opportunity where women can carry all their contributory work even after attending to their regular household chores. Thus, sericulture is ideally suited for family women in the rural areas.

Jayaram et.al (1998) showed that every acre of sericulture practiced under irrigated conditions had a potential to employ 247 men and 193 women round the year. They also have shown that the small scale mulberry farms provided ample scope for employment of owned family labour and suggested its potential to solve the problem of seasonal unemployment. Lakshmanan et al. (1999) found that female labour is quite dominant in all sericultural activities, to an extent of nearly 50%. Saraswathi and Sumangala (2001) observed that in the indoor activity of silkworm rearing, women participation was as high as 94.67 % and that except for the peak period the entire sericultural activity is conducted using family labour.

Farm women have certain unique attributes, which are of special relevance to sericulture development and that these characteristics make the female dominance in sericulture indispensable:

(i) A farm woman is the sheet anchor of the farm family. She is the foremost member who is concerned all the time about the well being of the family. So when women dominance is seen in any activity that has to be turned out to be a successful one. Silkworm rearing calls for intensive attention as well as mother's care, especially, for the larva stage. Identifying and then collecting mature silkworms and putting on spinning trays required a great deal of specialized skill and patience. Women members can ideally fit into the round-the- clock schedule of sericulture with intervals (Banerjee, 1990).

(ii) Women are proved to be an efficient home-maker from time immemorial. So whether as an artisan or a household industrial worker, she is supposed to give her best as it is involved with her family. Sericulture is such farm enterprises that have a great share of indoor components and demand enough tenacity and sufficient attention (care & nourishment). Silkworm rearing calls for intensive attention as well as mother's care, especially during the later stage of the larva.

(iii) According to the Central Sericultural Research & Training Institute, Mysore (See Guide to Sericulture Extension,), women have proven themselves to be better learners. The experts of the research institute at Mysore feel that women have better

capacity to concentrate, listen, integrate and recall. They are also easily adaptable which is important for a dynamic world where better sericulture technologies are about to pay better dividends.

Usha Rani (2007), in one of her studies have shown that the establishment of one acre mulberry garden for rearing 300 disease free layings (DFLs) of silk worms in two months generates 96.36 man days of employment, of which 72.70 percent are by women. She has also observed that cocoon cutting and sexing and egg incubation is exclusively done by women labour in villages of Andhra Pradesh. According to one statistical analysis, submitted at a National Conference on "Women in Sericulture" (held at Mysore on 16th and 17th March, 2007), sericulture can generate employment up to 11 persons (mandays) of every kg of raw silk produced, out of which more than 6 persons (mandays) are women. In India, more than 60 lakh persons are employed as full time workers in the production chain of this artisanal silk industry, out of which 35-40 lakh persons are women. In West Bengal, the farm sector of mulberry silk generated employment of 11259 in 2010-11 among which 6308 were women labour (DoS-WB, 2011-12).

On the other hand, so far as gender promotional aspect is concerned, sericulture is one of such activities where most of the activities are carried out by women alone, both in terms of operations performed and time invested. Ever-increasing demand to meet the domestic handloom industry requirements and equally increasing potentials for exports provide tremendous opportunity for the women to avail sustainable income generating activities in artisanal silk industry. The dominance of women workers in sericulture is historically evolved. Despite showing tenacity and persistence at work, their efforts remained unnoticed and they continued to work as unpaid family workers. However, this perception has changed for the better in recent years regarding the role of women in sericulture owing to the significance of the critical operations that they perform as well as their share in the production value although their participation in family income can hardly be observed as their increase in empowerment.

8.4.1 Objectives of the Study on Women Workers in Sericulture

Predominance of women workers in different artisanal activities of sericulture has been found in earlier studies. Studies indicated that around 60% of the aggregate work-activities in sericulture is handled by women in most of the sericulture producing states, irrespective of their regional variations (Acharya, 1993; Kumar 1993; Usha Rani, 2007; Sandhya Rani, 2006). However, determinants of female labour dominance in total workforce are perceived to be different from region to region depending upon several social and cultural criteria. Lakshman and Geetha Devi (2007) have explored women employment opportunities of sericulture vis-à-vis other agricultural crops in Tamil Nadu and have shown that 62.33% of workforce is shared by female labour force, where domestic women share has been seen as 34.06% while hired female workers share is 28.25% of the total workforce. Sinha (1989) asserts that women power in sericulture gets intensified as family labour employed in sericulture increases. But the contribution of unpaid family labour ultimately reduces intra-family power balance especially in the low income earning classes. Charsley (1988) pointed out that since middle-class domestic women have zero opportunity cost as wage-earners, their participation in the sericulture household industry does not affect their power balance, as in the case of lower income household. Regarding family power balance in lower income earning families, Charsley (1988) commented that if sericulture activities expand the scope of

paid employment opportunities (as hired female labour), then ultimately it improves the power balance in low income households.

In West Bengal, the reported female work-participation rate in agricultural work is substantially low due to 'statistical invisibility' of this class. This is particularly because neither the survey process includes the work of domestic women who are in household industry, nor are their productivities truly recognized inside the domestic space (Bagchi, 2005).

Even after being the third largest silk producing traditional state, adequate research work on women's participation in sericulture activities of West Bengal has not yet been pursued. The specific objective in this section is to fill this research gap. Along with describing the condition of women workers in sericulture of West Bengal, this section will specifically try to shed some light on the issues of dominance of women workers in this sector. Census statistics or NSS surveys do not specifically cover the participation rate of women workers in sericulture. Therefore this situational analysis would be based on micro /pilot surveys attempted by various researchers in different course of time from different corners of the country as well as on primary survey in certain sericulture rich villages of Malda district undertaken during this course of study. The secondary data individually as well as in aggregate would help to portray a gendered overview of sericulture activity in the country. The core research work would hinge on the present primary survey analysis of Malda District that produces more than three-fourth of the raw-silk of the state. In this context, it is also important to determine whether female dominance in sericulture sector has been translated into female empowerment in this region.

8.4.2 Impact of Female Dominance in Sericulture

The impact of female dominance in sericulture against the perspective of poverty stricken rural mass is also enormous. With the increasing rate of participation in work force, women also become a decision-making agent. She can actively participate in decision-making activity without being a passive performer. Thus the income generated by the rural women can be utilized more judiciously for the socio- economic development of the family. Moreover, in the report of the Working Group on "Empowerment of Women for XI Plan" (2006), it was emphasized that empowerment of women has two fold benefits:

(a) *Intrinsic Benefit*: A woman is gaining the benefit for sake of herself by joining in family workforce, other than household activity. It raises her self-dignity and self esteem. Her purchasing power and decision making power also rises.

(b) *Spillover benefit:* Involvement of women workers also raises the welfare of her family members. Education level rises, nutrition level rises and thus the spillover effect helps in a holistic development of all the household members of her family.

Thus the spillover benefits from women-empowerment can broadly be categorized into following major heads:

- Rise in education level of children
- Rise in Nutrition level of family
- Rise in Health Awareness (especially among the girl child)

- Rise in the level of social resilience power against different social crimes like dowry, domestic violence, social abuse, illegal trafficking etc.

A study conducted by CARE (2009) for rural India reveals that economic empowerment via micro finance plan projects of women raises 125% of expenditure on education of their children and now they spend at least more than 43% on health care of their children. Micro surveys conducted by Ray (Ramesha & Sinha, 2009) also supported that women gaining employment from sericulture always take care of their families more than before. They are able to ensure better education for their children on one hand and help their husbands in running their occupation side by side.

Previous research activities also indicate that economic participation of women – their presence in the work force in quantitative terms – is important not only for lowering the disproportionate levels of poverty among women, but also a significant step forward towards raising household income and encouraging economic development of the society as a whole.

Through application of science and technology appropriate to the socio-economic condition of rural areas, rural women can be made economically self-dependent. There exists a preconceived notion that women do not want to learn new skills and techniques because they seem to be engaged only in primary household activities. This age-old belief acts as a bias against their inherent capability of adaptation. This notional bias itself contains some inbuilt contradiction and needs to be modified. Sericulture is such a family based occupation where the women can work along with their family responsibilities.

Empowerment of women always makes a match between economic opportunities and their capabilities. Most of the time due to lack of concern, economic opportunities are lagging behind the capabilities of women in different social sectors. Increased women's participation and earning have not only helped them to raise their confidence, but also it has helped in reduction of poverty and accelerating growth. It also has a favourable impact on education and health outcomes of children.

8.5 Involvement of women workers in Indian Sericulture

In India, four major states traditionally involved with mulberry silk production are (i) Karnataka , (ii) Andhra Pradesh, (iii) West Bengal and (iv) Tamil Nadu, the work-participation rate of women reveal that during the last decade the participation rate working women in all states were more than the national average besides West Bengal. However, participatory role of women worker in sericulture is mostly confined within their domestic territories and thus constitute a part of the informal and un-organized sector, which may not be exactly revealed through this picture as portrayed in Table 8.1

Table 8.1 Rural Female Work Participation in India during 1971-2001

Silk Producing States	1971	1981	1991	2001
Andhra Pradesh	31.9	44.9	34.22	34.93
Karnataka	19.0	30.8	29.39	32.0
Tamil Nadu	20.4	34.5	29.89	31.32
West Bengal	**4.6**	**9.4**	**11.25**	**18.08**
ALL INDIA	15.8	23.5	22.25	25.68

Source: Census of India 1981, 1991, 2001

Barring West Bengal, all three states revealed their prominence as well as growth in work participation rate of women workers. Within West Bengal, Malda, Murshidabad, Bankura and Cooch Behar districts are the prominent districts for sericulture, silk production and silk weaving. Murshidabad is famous for silk weaving, where female participation in household industry is 64.7% followed by Malda (37.17%) (Govt. of WB, 2001-02). Malda is the leading district in silk production and holds a golden legacy since the time of Mughal period. Women's participation as agricultural and marginal agricultural labour in the district is 31% and 53.5% according to 2001 census.

However, a study by Rajapurohit and Gobinda (1981), specifically on artisanal silk industry revealed a completely different picture of female labour work participation ratio in Bihar, West Bengal and Karnataka, while female employment (at over 58 percent) appeared to be the highest in West Bengal.

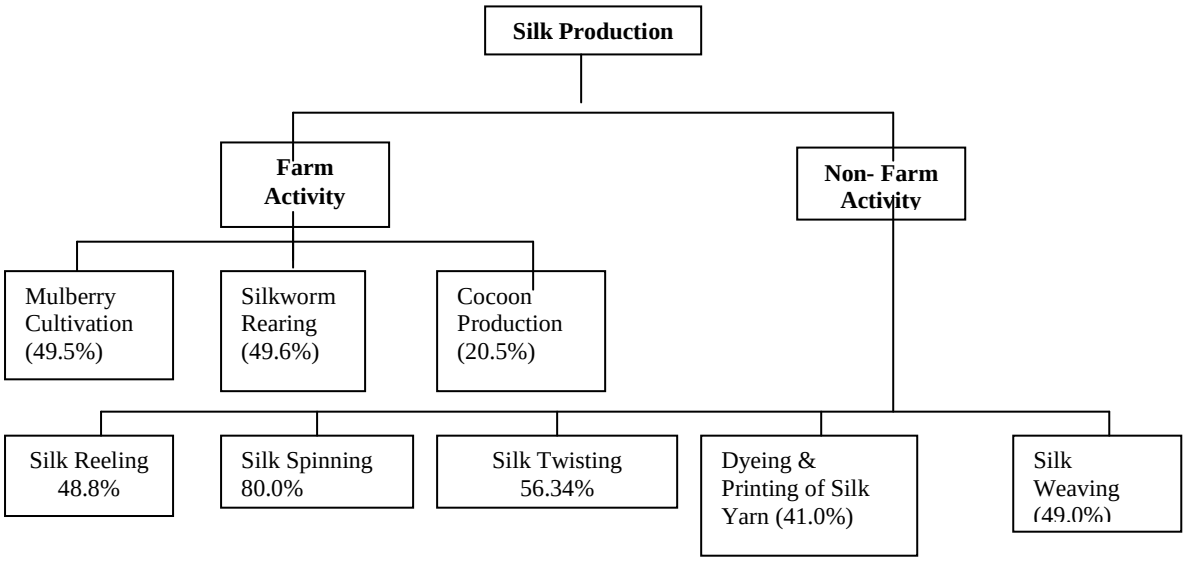
Table 8.2 Female Labour Ratios in Raw Silk Production (1981)

States	Female/ Male Labour Ratio
Bihar	0.14
West Bengal	1.42
Karnataka	1.15

Source: Raja Purohit et. al. (1981)

Sericulture creates the highest job opportunities compared to other principle crops. Further, in terms of women employment opportunities it creates greater man days from one acre of land compared to other food crops (Lakshman & Geetha Devi, 2007), where a substantial percent of workforce is drawn from own family source. Therefore, sericulture is often called as one such vocation where the members of the household can be utilized at a higher scale. Usually, the work participation of female rural labour is mostly obstructed by their domestic obligation; in this context, sericulture can break the barriers faced by women from participating as workers while continuing with their household activities.

Figure 8.1 Women's Involvement in Silk Production



Source: Central Sericultural Research and Training Institute, Mysore, Gangopadhyay (2008)

Few pilot surveys and studies help to reach the conclusion that women worker participation is nearly 50 percent in mulberry cultivation, silkworm-rearing, silk worm reeling and silk weaving, while it is 80 percent in case of silk spinning (Gangopadhyay, 2008). The chart furnished here (see fig 8.1) provides a schematic representation of involvement of women in various stages of silk production. Involvement of women is higher in all activities of sericulture except in field preparation of mulberry; cocoon cutting, sexing and egg incubation are done exclusively by women labourers. Weeding, transport of mulberry-leaves (which is food of silk worm) to the rearing sheds and rearing worms are the important activities where women involvement is also higher and these activities usually create employment of 11.18, 10.75 and 7.13 working-days respectively, per acre of mulberry crops. Feeding of worms and planting of mulberry creates employment of 6.93 man days and 6.49 man days per acre crop to the women. Transfer of worm to *chandrikas*, cocoon-sorting, leaf harvesting, chopping and other important activities that create employment of 6.01, 4.51 and 3.7 man-days respectively to the women. Preparation of field for growing mulberry creates an employment of 7.81 man-days of which 5.13 man-days are for men and 2.69 are for women. This is the only activity where employment of men exceeds women (according to the field survey report in Hindupur and Madakasira Divisions of Anantapur District in Andhra Pradesh, Usha Rani, 2007) [See Table 8.3].

Table 8.3 Women Labor Involvement in Sericulture

(Per acre of mulberry crop for rearing 300 dfls of silkworms in two months)

Operation	Male Labour (man days)	Female Labour (man days)	% of Female Labour Involve ment
Field Preparation	5.13	2.69	34.4
Planting	4.09	6.49	62.0
Fertilizer Application	1.76	2.95	62.6
Weeding	3.08	11.2	78.3
Harvesting &Chopping	1.73	3.7	68.1
Transport (mulberry leaves)	2.15	10.8	83.7
Cocoon, Sorting of seed	0.16	2.11	97.6
Cocoon , ,Cutting sexing	0	1	100
Egg Incubation	0	1	100
Rearing	1.78	7.13	80.0

Brushing	0.17	1.93	91.9
Feeding	3	6.93	69.7
Transport to Chandrikas	1.45	6.01	80.5
Cocoon Sorting	1.57	4.51	74.2
Mounting & Cooking	0.35	1.67	82.7
Total	26.3	70.1	72.7

Source: Usha Rani, Journal of Social Science 14(3), 249-255, 2007

Sandhya Rani (2006) explained that almost all activities of sericulture are carried out by women except for some which are mostly undertaken by male labourers (e.g., cutting of mulberry leaves, pruning, etc). There are certain activities like weeding, leaf harvest, silk reeling, which are exclusively handled by women labourers. She said that about 2562 women work-days are created in all activities of sericulture from one hectare of irrigated mulberry area per annum out of a total 4225 working days. During the first years of establishment, it generates about 5.8 work years for women out of a total of 9.5 work years per hectares under irrigated condition. On the other hand, after the establishment of irrigated mulberry (third year onwards) 7.0 work years are generated from women out of a total of 11.5 work years. Thus the female dominance in workforce as well as in employment generation is intrinsic to sericulture activities.

8.5.1 Involvement of women workers across variable scales of farms

Sericulture provides both the family female labour (who belong to mostly middle class) and hired female labour (who are drawn from lower class families) a wide opportunity of employment. Middle class female labour always bears a greater domestic burden. They do not suffer from acute poverty and thereby can never join the hired labour force as done by female worker belonging to lower economic classes. Therefore we can say paid employment opportunities of hired labour are much larger in the lower strata than the middle class housewives of sericulture families. So, Charsley (1976) pointed out that silkworm rearing represents a suitable domestic activity for the women folk of the middle class sericulture families, who would not be expected to work outside home.

Theorists of women studies state that economic empowerment can truly create an emancipating environment for the women, because it always helps the women to participate in all the decision making processes regarding household (Bagchi, 2005). Family labour in that case can be assumed as the second best option vis-à-vis wage labour, because monetary transaction remains invisible in case of family labour payment. In case of hired female labour, huge cases of exploitation has been observed in the literature. Wage discrimination is very commonly practiced and the laborers are often paid either in meager amount of cash or in kind (Lakshman & Geetha Devi, 2007; Sinha, 1989; Reddy,1994; Nayyar, 1987; Chavan & Bedamatta, 2006; Mukherjee, 2004;). Thus regarding the question of economic emancipation as well as self-esteem, sericulture opens opportunity for this unskilled working force to claim wages from their working place and that will surely raise their intra family power balance (Charsely, 1988). Charsley also (1976) said that both mulberry cultivation and

silk worm rearing employ household labour, but the latter provides respectable, domestic occupation for ladies of the upper agricultural classes.

Again in the activities like reeling and weaving, scale of business varies widely. When a poor man operates a single simple machine using his family labour (i.e. his wife), the female labour gets attached with an artisan belonging to lower economic class. This particular woman attached to her small scale family firm is devoid of much opportunities and freedom. On the other hand, a wealthy businessman running 1500 or more complex machines employs hired labour from local communities, who are generally poor and of low traditional status. The women workers attached with this rich business class artisan enjoy access to greater economic opportunity and, thereby, enjoy greater spirit of freedom.

Amartya Sen(1999) has opined that Indian society wants to see women less as passive recipients of help and more as dynamic promoters of social transformation, which is only possible through greater ways of emancipation. For this their self esteem has to be raised at much higher level. Empowerment of women should, therefore, be viewed as a catalytic element of social transformation.

8.5.2 Women in sericulture and health issues

Sericulture is, however, alleged to have various adverse effects on health; In other words, there are occupational hazards associated with sericulture. Women suffer from giddiness, burning of eyes, backache, fatigue, and other related problems. As a result, they are desperately looking for health insurance in sericulture. Reeling sector, where mostly women are employed, is one of the areas where the health problem is very intense. The major occupational health problems observed in this sector are asthma, infection, blisters on hand and burning of eyes. In seed production centers, due to high concentration of silk moth scales, dust and acid fumes, the workers are suffering from asthma, cough, dyspnoea (shortness of breath), skin allergy, abdomen pain etc. But other disciplines like host plant cultivation, silkworm rearing etc. are relatively free from occupational health problems.

Most of the health problems affect women more because of their greater involvement and the regular health related issues in the family also make them more vulnerable both physically and financially. Central Silk Board in association with respective State Sericulture Departments launched Health Insurance Program for women beneficiaries to address the health related issues in this sector.

8.5.3 Gender bias in wage differential

Discriminatory practices in the labour market of rural India are reflected in the actual low wages payment to women workers despite having provisions of minimum wage laws. On the other hand male wage earners are always paid above the stipulated wage. Due to existence of this marked wage differentials, these two different categories of labour respond to the wage rate in different ways. Official statistics like Agricultural Labour Enquiry and Agricultural Wages in India, which provide data on wage rates of male and female casual labourers confirms this phenomenon. (Pandy et. al, 2007). The increase in gender disparity especially in agricultural wages is quite marked in India through out the planning period. For majority of women engaged in paid activity, the fact being female means being paid less than men for same work. It is most evident in the cases of agricultural labourers. Agricultural daily wages

are, in general, low, though they vary by type of agricultural operations (ploughing, sowing, weeding, harvesting etc), by the typical nature of state and, most importantly, by gender. Some operations, like ploughing, do not involve women at all, whereas others such as weeding are women-intensive activity.

All the previous analyses bear the testimony that if men and women perform the same function, men will be paid at a much higher rate. For India, as a whole for each of the farm operations, the male wage rate is higher than the female one. Despite the fact that the wage rate for workers is lower, employers prefer to hire male workers due to pre-determined socio-cultural prejudices. Each state has a Minimum Wage Legislation, whereby wages are statutorily fixed. However, in the early 1970s, after much deliberation, some state governments deliberately fixed differential wage rates for men & women and two prominent silk producing states Tamil Nadu and Andhra Pradesh were two of these states. By 1980-81, the differentials seemed to have narrowed down, though the change was perhaps not the real one because despite a huge call for equal remuneration across gender, women are still less paid than their male counterpart. Sericulture and silk involves both agricultural and household industrial work. We have talked about the plight of the women in agricultural sector. In HHI sector women are exploited by intermediaries and middlemen who provide raw materials, machineries and market the final product, but pay the women very small amount.

According to NSSO (2004), among four traditional silk producing states, actual wage differential (for ploughing, weeding etc.) between men and women are highest in Tamil Nadu (i.e., Rs. 77.60), followed by West Bengal (Rs.34.85), Andhra Pradesh (Rs. 23.06) and Karnataka (Rs.27.17). The female work participation in all three major states (except West Bengal) reflects that higher wage differential always leads to lower work participation of female labour. However, we have to be aware about the exclusion of the family workers in the data collection which always gives rise to persistent problems of under counting and statistically invisibility of women (Mukherjee, 2004).

Wage of the labour depends on different terms and conditions of the work, duration of work, and nature of work. Though provisions of minimum wage legislation has been enacted to establish equality in terms of wage irrespective of sex, wage differential in unorganized sector depends on hard reality of different efficiency parameters, including physical labour, productivity. For example, hired female labour is more casual labour than permanent and therefore wage rate varies.

The mode of payment also varies across gender. While male labourers are paid in cash, or in kind or both, or even in the form of a share of the crop, payment to female labourers at least where there is exclusive female employment, is either solely in kind, or in ‘cash and kind wages’.

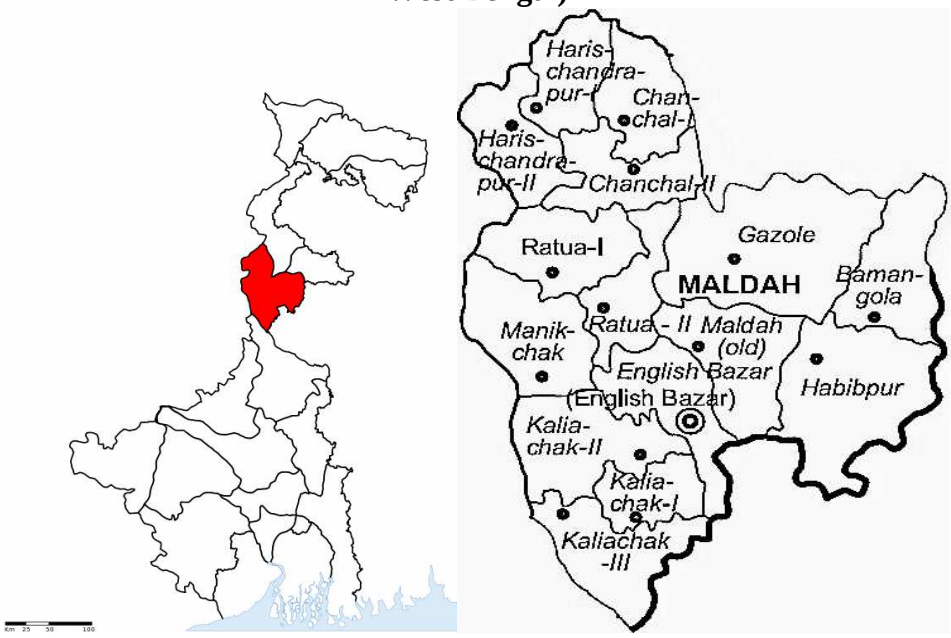
8.6 Women workers in sericulture: A case study of Malda district

The present investigation was carried out in Malda district where sericulture is a traditional vocation. With 75% of state’s share and 6% of national share, Malda acquires a prominent position in raw silk production in West Bengal (Ali et al, 2008). Official Statistics provided by Deputy Director- Sericulture, Malda, 2010, justifies the reason of choosing this district. The district has more than 20,000 acres of land under mulberry cultivation and nearly 60,000 families are directly or indirectly earning their livelihood from sericulture. Out of total

sericulture farmers, reelers, traders, 80-85% belong to Muslim Minority. Women play a pivotal role in this activity as 60% of work force come from women members of the family or hired labour. The research queries in this section are related to the factors which cause this female dominance in sericulture sector of this region.

The Kaliachak Block was chosen for our primary survey area as mulberry cultivation and rearing and reeling farms are primarily clustered in this block of Malda district. Kaliachak-I and Kaliachak-II blocks are comprising 90% of the total mulberry cultivation area. Kaliachak-I itself occupies 61% of the total cultivated area under mulberry in the district (See Ali et al., 2008). Twenty percent of total sericulture farmers of the district live in this block (Official Statistics, Deputy Director Malda, 2010). Stratified random sampling is done to choose few sericulture rich villages namely, *Gayes Bari, Sujapur, Mothabari, Marupur, Alipur, Sershahi, Feranchak, Joshkabil* from this block, while stratification was done on the basis of participation in sericulture activities as prominent livelihood. Twenty five to thirty households involved with sericulture activities have been chosen from each village using stratified random sampling. Thus total 212 households constituted the sample size of our study. A list of questions regarding their age, education, religion, size of household, structure of household, annual earned income, occupied man-days, cost of instruments and raw materials, female participation, number of hired workers involvement, credit access, wages paid to male and female hired workers, degrees of freedom and power of decision making in various household as well as sericulture activities enjoyed by the female members of the households were asked to all respondents randomly chosen from these villages. Feedback received from the respondents helped to tabulate the data and carry forward the analysis in desired direction.

Fig 8.2 : Location of Primary Survey Region (Kaliyachak I &II in Malda District of West Bengal)



According to our pre-notional hypothesis (based on literature reviews) the major influencing factors behind the female dominance in sericulture workers are:

(i) Wage differential between male and female: Higher the wage differential between male and female workers, higher is the chance of female dominance in poverty stricken household farms. Poor households will substitute costly male labour with cheaper female labour, causing higher female dominance. So grater the difference between male and female wages, greater is the chance of the sericulture labour activities of the household being female dominated.

(ii) Ratio between hired female workers to domestic female workers: A general hypothesis is that as the number of domestic female worker rises, number of hired workers usually rises (as the field survey reveals) and the combined effect would have a positive impact on female dominance in sericulture- farm. If the ratio of hired to domestic female labour rises that is expected to dominate the whole labour force by female dominated one.

(iii) Economic situation: Economic situation of a farm may also influence the female dominance of the farm. Wealthy farm households can afford to employ expensive male labour instead of its cheaper female substitute. Whether bigger and wealthy farms are affected by Veblen effect and may prefer costly male labour as better productive labour is subject to queries in this analysis. Therefore, economic situation of a farm can be expected to exert a negative influence on female dominance status of the farm.

(iv) Household Size: The household size may have a greater influence in controlling the degree of female dominance in household industry like sericulture. Therefore, whether a smaller household has a greater or lesser degree of influence on female dominance in sericulture is an interesting point of study. It depends upon different sociological parameters too. Women in large households are often observed as captives where her freedom is restricted by many social factors.

(v) Number of Female in Household: Higher numbers of females in household always act as a liberating factor for women. Therefore higher degrees of female dominance should be visible in those household.

(vi) Mulberry Area: Women workers are supposed to dominate in rearing activity while the mulberry cultivation is performed by male members of the household. Therefore if the household possess greater area of mulberry field, it is expected that the female dominance in labour force would be declined.

(vii) Education years of the Principal Earners: If the head/principal earner of the family has higher education back ground, it is expected that he would not allow her daughters to get involved with household business leaving educational activities. Therefore an inverse relation is the possible relation between education years of the head of the household and female dominance of sericulture farms.

(viii) Number of Children in Family: Increase in number of children in the family makes their mother more concerned. She likes to dominate the workforce making the labour force female dominated, as she becomes more worried for the health and education of her children.

(ix) Wage of male labour: As the wage of male labour rises, the obvious consequence is increase in demand of female labours. Therefore female dominance is the natural consequential outcome.

(x) Wage of female labour : As the wage of female labour rises, the outcome is uncertain. Since female wage is much lower in this unorganized market that rise in wage rate may hardly affect any decision of changing labour composition. Besides most of the work in this sericulture activity requires mother-care.

(xi) Man-days: If the total number of days of work of any farm is higher compared to another farm, it is likely that female dominance in labour force of the former farm will be lesser. We make this hypothesis on the basis of our experience in field survey. Women labour force is essential in this particular rearing and artisanal work. But when the income [8]generation activities are expanded (say in number of days involved in it), female domination in labour force is lost.

(xii) Cost of raw Material: Female labour forces are more associated with those household business activities where cost of implement is usually lower.

(xiii) Loans: Loans taken in higher level implies a household aspiring for high income status, therefore female dominance is supposed to be lower in this household.

(xiv) Daily Working Hours of Female: Where the female members are able to spend more time on household business activities, the obvious outcome would be female dominance in labour force.

(xv) Family Empowerment Index: Following the construction of 'Women's Empowerment in Agricultural Index' (Alkire et. al., 2012), a similar index in sericulture has been constructed which can be called Family Empowerment Index (FEI) of Sericulture Women (C_f)

$$C_f = w_1I_1 + w_2I_2 + w_3I_3$$

Where, I_1 = 1, if the household women participate in decision making of running daily family expenditure;
= 0, otherwise;
I_2 = 1, if the household women participate in decision making about the health and education of her children in the family (including her own reproductive health);
= 0, otherwise;
I_3 = 1, if the household women participate in decision making about her household business, i.e., sericulture.
$\sum w_i = 1$, i= 1, 2, 3 (w_i being the weightage)
We feel all three decisions in a sericulture family are equally important. So we assume equal weights to all three decisions, i.e.,
$w_1 = w_2 = w_3 = 1/3$

(xvi) Social Empowerment: To assess the social and political position of a sericulture woman, an indicator namely Social Empowerment of Sericulture Women (C_s) has been constructed, here, following the computation method of 'Women's Empowerment in Agriculture Index'.

$$C_s = w_4I_4 + w_5I_5 + w_6I_6$$

Where, I_4 = 1, if the household women actively participate in NGO (Non-Government Organization) being a member of the NGO;
= 0, otherwise;
I_5 = 1, if the household women participate in any Self Help Group as a member of that group;
= 0, otherwise;

I_6 = 1, if the household women represents any political party either in local or zonal or in higher constitutional body .
$\sum w_i = 1$, i= 4, 5, 6 (w_i being the weightage)

All three social fields are equally important for household women involved with sericulture for expressing and controlling her social views. So we place equal weights to all three social participation, i.e., $w_4 = w_5 = w_6 = 1/3$

Female dominance has been specified in this section as share of female work force in total workforce and a separate regression equation has been framed for running the regression test using OLS. In the model, we assume the share of female workers (including both household and hired women labour) in total labour employed in a sericulture farm as a parameter of female dominance and interpret that dependent variable as

Share of Female Workers = (Household Women Workers + Hired Women Workers) / Total Workers

The econometric results of Model of Female Dominance are furnished below. The estimated F-ratio of the model is statistically significant, which ensures the goodness of fit of the model. The graphical inspection of plot between predicted dependent variable and the residuals reveals no discernable pattern and hence no hetereoscedasticity problem is caused by these variables. The VIF ratios are indicating that there is no significant multicollinearity problem in the model and low standard errors are also indicators of good specificity of the model. The R^2 and Adjusted R^2 are 0.553 and 0.535, which implies even after taking into account the number of predictor variables in the model approximately 54 % variability of the dependent variable (i.e., share of female workforce) can be explained by the explanatory variables of the model.

Table 8.4 (a): Model Summary (Female Workers' Dominance Model)

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.744	.553	.535	.1160	.553	31.249	8	202	.000

a Predictors: (Constant), Household Size, Educational years of the HoF, Man-days, Female Empowerment, Wage of Male Labour, Wage of Female Labour, Number of Child in family, Female members in family
b Dependent Variable: Share of female workers

Table 8.4 (b):ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3.362	8	.420	31.249	.000
Residual	2.717	202	1.345E-02		
Total	6.079	210			

a Predictors: (Constant), Household Size, Educational years of the HoF, Man-days, Female Empowerment, Wage of Male Labour, Wage of Female Labour, Number of Child in family, Female members in family
b Dependent Variable: Share of female workers

Table 8.4 (c) Estimation of Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**	**T**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Tolerance**	**VIF**
(Constant)	.661	.026		25.179	.000		

Educational years of the HoF	-4.448E-03	.002	-.118	-2.423	.016	.938	1.066
Female members of Family	6.634E-02	.009	.567	7.254	.000	.362	2.765
No. of Child in Family	4.790E-02	.008	.437	5.861	.000	.398	2.511
Wage of Male Labour	-1.039E-03	.000	-.548	-9.492	.000	.663	1.509
Wage of Female Labour	9.173E-04	.000	.230	3.967	.000	.661	1.514
Man-days	-3.412E-04	.000	-.162	-3.149	.002	.837	1.194
Family Empower-ment	5.059E-02	.022	.111	2.261	.025	.914	1.094
Household Size	-3.642E-02	.005	-.776	-7.600	.000	.212	4.711

a Dependent Variable: Share of Female Workers

Interpretation of Coefficients

A rise in school education years by 10 years of the Principal Earner (usually, Head of the Family) in the household will reduce the female domination in domestic work sphere by 4 percent. An educated head of a household will naturally try to involve his/her young female members of the household to get more involved with sphere of education. Naturally that would have a significant effect on reducing female share in household workforce.
One unit rise in the size of household will reduce the female-labour share in total labour force of a sericulture farm by 3.6%. This unequivocally reinforces the traditional myth and feminist claim that in large household women carry the domestic burden, while responsibility of economic work is being shouldered by male member of the household, which corners the chance of emancipation of women members of the household as such. Therefore the result is not surprising in rural sericulture too.

On the other hand, if there is increase in number of females in household by 1 unit, then the chance of female dominance in workforce is raised by 6.6%. This result is also fairly logical, as female dominated households are always expected to exert their dominance in work-sphere too.
A rise in child member of the sericulture household also raises the female share in total work force of sericulture by 4.7%. Between male and female child, male child is usually engaged outside either for education or for joining in child labour force in several economic activities. Girl children are usually confined in the house by most of these community people for sharing in several domestic business activities. This raises the female share of the total work force in the sericulture as sericulture work is principally hinged on women workers.
A rise in wage of male labour reduces the female share in workforce by 0.1%, which is bit difficult to justify from common perspective. We need to use more cautious foresight and our field experience to explain this anomalous behaviour. When wage rate of hired male labour rises in sericulture sector, it indirectly declines female hired workers' relative wage rate. Female hired workers feel deprived in this sector and try to shift their labor to some alternative works (e.g., beedi binding, jute work, polythene bag manufacturing etc.) where their relative wage is comparatively higher. Therefore female dominance is reduced due to supply side shortages

On the other hand, a unit rise in wage of female labour naturally increases the female labour supply in the workforce and female dominance in the workforce of sericulture by 0.1%.
Though impact of this male and female wage rate change is not very high on female dominance (i.e., only 0.1% in each case) but what is discernible is that sericulture labour force is rather supply driven than demand driven. It is the supply of work force which ultimately determines what would be the composition of labor force. This is not expected to be the case in a labour surplus economy and needs further investigation, which is beyond the scope of this research study.

A rise in 100 days of work in a year (which means actually sericulture work for two seasons) ultimately reduces the work-share of female labour by 3 percent. It is also seen that income and female dominance in labour force has an inverse relation, which indicates that wealthy farms prefer male hired-labour more than female labour force. The general perception is that it may be due to their greater productivity which is difficult to justify. But it has been found from the field survey that women of affluent classes do not participate in income generation process. Higher man-days are indicative that the firm is rich (Roy, RoyMukherjee and Ghosh, 2012). Therefore increase in man-days naturally leads to reduction in female domination in work force.

The most interesting result of this model is the link between female dominance in workforce of sericulture and Family Empowerment of Sericulture Women. The result reveals a significant and direct relation between them. A rise in Family Empowerment Index (C_f) by 0.1 unit would increase the female share in work force by 0.52 percent. Though the impact is not very high, but still it indicates an important relationship.

Besides the significant explanatory factors, the “sign” of the insignificant variables are also important indicators to explain the model. Female dominance is inversely affected by several explanatory variables, e.g., mulberry cultivation area possessed by household, income, loan, social empowerment. Although the regression coefficients of these variables are not significant, it is important to explain the inverse relation and the rationale behind them.

A higher area of mulberry cultivation by farm actually raises the male labour work share in total work hours and that indirectly declines the female dominance in work force. Higher loans taken by the households are having higher level of income status who can keep male hired work force. This justifies inverse relation between higher amount of loan advance and female dominance in sericulture labour force. Increase in social empowerment of household women has an inverse relation with female dominance in workforce of sericulture farms. Higher the participation of women in diversified social organizations and political organizations, more they become aware and conscious of their own rights. This seemingly lowers their inclination towards day to day household chores. This reduces the female dominance in workforce of sericulture activities.

8.6.1 Construction of Women Empowerment Index in Sericulture

Women’s Empowerment Index or WEAI (IFPRI, 2012) has been introduced recently by the US Government’s Global Hunger and Food Security Initiative to overcome the obstacles and economic constraints faced by the agricultural women in Less Developing Countries. As empowerment is inherently context specific and shaped by the socio-economic, cultural and political condition, two indicators of women empowerment will be constructed relevant to sericulture, following the computation method of WEAI.

Two broad domains have been chosen for computing the empowerment indices specially, where sericulture women are expected to exhibit their power after being financially supportive in this household industry, viz, (i) Within Family Sphere, (ii) Within Social Sphere.

Family Empowerment Index (FEI)

Within Family sphere the empowerment of the women depends upon her participation in decision making role in following three household activities:

(a) Various decisions with respect to silk production
(b) Control on the use of income earned from sericulture
(c) Decisions about health & education about her children (including her own reproductive health)

These three sub-indicators are given equal 1/3 weights to construct 'Family Empowerment Index' in Sericulture (C_f)

$$C_f = w_1I_1 + w_2I_2 + w_3I_3$$

Where, I_1 = 1, if the household women participate in decision making of running daily family expenditure;
= 0, otherwise;
I_2 = 1, if the household women participate in decision making about the health and education of her children in the family (including her own reproductive health);
= 0, otherwise;
I_3 = 1, if the household women participate in decision making about her household business, i.e., sericulture.
$\sum w_i = 1$, i= 1, 2, 3 (w_i being the weight)

All three decisions in a sericultural family are expected to be equally important. Thus the assumption of equal weights to all three decisions is made, i.e.,
$w_1 = w_2 = w_3 = 1/3$
FEI ranges between 0 and 1.

$$0 \leq C_f \leq 1$$

C_f = 1 would imply family empowerment at highest attainable level, which also signifies gender parity at perfect level within family
C_f = 0 would imply absolute disempowerment of women within family structure

Empowerment has not been defined in binary consequence as either empowered or disempowered. Field experience has helped to find women with different level of empowerment. According to the model construction the family empowerment in sericulture women in Malda district is 0.25, which is even below the moderate level of empowerment. The socio-economic background in the minority concentrated regions is the major reason for this low level of empowerment even in sericulture farms where domestic labour force is seen to be women labour dominated. An attempt has been made to compute the association between Family Empowerment Index of Sericulture Women and several other socio-economic factors using primary survey data collected from sericulture rich villages of Malda District of West Bengal and some notable results have been found (see table 8.5).

Social Empowerment Index

As sericulture is an indoor activity, Family Empowerment is more crucial for the women for taking decisive role. However in order to include the leadership domain it is necessary to build a Social Empowerment Index of Sericulture Women. Being more socially empowered the sericulture women are expected to take leading role even in marketing and other outdoor activities associated with sericulture livelihood. The three indicators which capture the essence of social empowerment in sericulture villages of West Bengal are as following:

(a) Member of NGO (social interaction)
(b) Member of Self Help Group (social grouping for economic interest)
(c) Representative of Political Parties (power of talking in public)

The three sub parameters are given equal weights 1/3 to construct 'Social Empowerment Index'(C_s) in the artisanal silk sector:

$$C_s = w_4I_4 + w_5I_5 + w_6I_6$$

Where, I_4 = 1, if the household women actively participate in NGO (Non-Government Organisation) being a member of the NGO;
= 0, otherwise;
I_5 = 1, if the household women participate in any Self Help Group as a member of that group;
= 0, otherwise;
I_6 = 1, if the household women represents any political party either in local or zonal or in higher constitutional body .
$\sum w_i = 1$, i= 4, 5, 6 (w_i being the weightage)
We feel all three social fields are equally important for any household women involved with sericulture for expressing and controlling her social views. So we place equal weights to all three social participation, i.e.,
$w_4 = w_5 = w_6 = 1/3$

SEI also ranges between 0 and 1. $0 \leq C_f \leq 1$

C_s = 1 would imply social empowerment at highest attainable level, which also signifies gender parity at perfect level in society

C_s= 0 would imply perfect disempowerment of women in the society

Empowerment has not been defined in binary outcome e.g., either the woman is empowered or disempowered. Field experience helped to find sericulture women with different level of empowerment. According to the model construction of social empowerment it is found that the value of SEI for sericulture women in Malda district is 0.04, which is much below than the moderate level of empowerment. The socio-economic background especially in the minority dominated regions is the major reason for this low level of empowerment. An attempt is made to compute the association between Social Empowerment Index of Sericulture Women and several other socio-economic factors as mentioned earlier (see table 8.5).

Table 8.5 Correlation between Empowerment Index in Sericulture & Socio-Economic Factors

Associated Factors	Family Empowerment Index **(FEI)**	Social Empowerment Index **(SEI)**
Ratio of working women in family	Spearman R= -0.184** Kendall's R = 0.149**	Spearman R= -0.031 Kendall's R =-0.026
Number of Child Workers in the family	Spearman R= -0.162* Kendall's R = - 0.140*	Spearman R= 0.013 Kendall's R = 0.011
Income of Sericulture Farm	Spearman R= 0.126 Kendall's R =0 .095	Spearman R= 0.021 Kendall's R = 0.018
Average years of education of Head of household (usually a Male)	Spearman R= -0.116 Kendall's R = -0.098	Spearman R= 0.176* Kendall's R = 0.153*

* significant at 0.05 level; ** significant at 0.01 level;

Interpretation of the Results

A significant association has been found between ratio of working women in the family and the family empowerment which is very natural. More and more involvement in income generating activities makes the women more empowered while the social empowerment has an inverse relation with ratio of working women in the family (though not in significant proportions). One can defend this inverse association by explaining an higher the community involvement by woman lowers thier chance of involvement in family enterprises. Moreover, sericulture activities of women require time and care which is around 10hours per day during the rearing season. Therefore it is quite understandable why a socially empowered woman is less associated with sericulture workforce within domestic arena.

An empowered woman would always prioritize health and education of her children. So if her empowerment rises, she would not let her children work inside the house. She would rather send them to school instead of supplementing family income against their toil. Social Empowerment has however no significant relation with children workforce in the family.

Though women empowerment is often called a tool for poverty alleviation, no significant relation could be observed between income earned by a sericulture farm and empowerment of the household women within and outside her house.

The final result is most interesting and it opens few new issues in the arena of Women's Studies. It has been found that the 'educated head of the family' is more associated with 'the farm women having less empowerment within domestic sphere'. Education of the head of household (who is usually male, except the women headed household) may increase his confidence in taking entire decision of the home. However, the relation is not statistically significant like positive association between social empowerment and education of the head of the family. This reinforces an old idea that education always broadens the views of a common man living in a conservative society and makes him more radical and rational. Thus social empowerment is seen to be significantly associated with those sericulture household whose head of the household is more educated.

8.7 Conclusion

Sericulture is thus ideally suited for land and labour abundant economy like India as well as in West Bengal, not only because it is low capital intensive but also because it is women labour intensive. Gender promotion and thereby social transformation along with poverty eradication is one of the major features of this particular sector. In case of West Bengal, the survey analysis shows that higher percentage of female members in the household can raise the gender dominance of the sericulture farms and gender dominance is associated with higher level of female members in the household, wage of female labour, family empowerment of domestic women. But, if the size of household rises and greater number of male workers are being attracted to join the sericulture farms, possibly due to higher returns, they push out the female workers to domestic unpaid work.

However, the welfare impact of a female dominated farm is always redistributed to different sections of the society and a gross level of up-gradation in nutrition and education level of the household is possible only through the spillover effect of this female employment generation. Therefore, holistic level of development is possible via gender promotion only. Situational analysis of women workers in this sector provides a scope to review the actual condition of the working women in sericulture and recommend few measures thereof.

Family Empowerment in household can be raised through rise in health, education level of female members of the households, which again reinforces their dominance in income generating household activities. Ensuring female education in remote areas and female health care in rural household (including their reproductive health) the government can make this breakthrough. Sen (1999) stated that women should not be a passive recipient of institutional help but a dynamic promoter of social transformation. This requires a change in outlook of the society as a whole.

Gender discrimination against women workers in wage payment has to be legally banned and rightfully implemented, which requires good governance. The Women's Rights Commission may adopt positive roles in this direction. More incentive schemes (like concession in taxation, etc.) if provided to the employers is expected to raise the involvement and recognition of women workers in sericulture farms. Solely women workers dependent sericulture farms require some primary institutional support and initiatives so that sole-women household members can survive and sustain this livelihood. Women workers in West Bengal as a whole should be given proper recognition. Then only their rights can be ensured. Low levels of education and low skill have obstructed their inner potentials to come out. Sericulture opens up a vast scope for them to extend their work abilities and expand their participation domain. Institutional support requires to be extended to these poverty stricken rural women so that they can be initiated to adopt sericulture as a source of earning their own, besides their domestic chores of activities. However, all these will be mere rhetoric unless the gap between policy suggestion and actual implementation is eliminated. Therefore, restructuring the process of implementation is also urgently required at this time. Then only the status and existence of the invisible, unrecognized and unremunerated women workers can be promoted. Drastic change in the mind-set is also required while implementing equal remunerations and ensuring female dominance in farms. The Equal remuneration Act of 1976 should be seriously adhered to and ensured by local governance. Presently, monitoring and reviewing of the employment scenario in case of sericulture has become imperative.

Socio-economic regional policies have to be remobilized in such a manner that various government policies and schemes to promote women's social and economic welfare may be dovetailed to maximize such gains in welfare of women workers in this sector. This only can address the poverty situation of the workers and empower them to have a voice of their own.

The next chapter will conclude this research study through suggesting few policies and restructuring some existing ones so that artisanal silk industry in West Bengal can reach its desired level of success, given its potential and past glorious heritage.

CHAPTER: 9

SUMMARY & CONCLUSION

9.1 Summary of Research Findings

The present chapter will provide a summary of the whole study as elaborated in the previous chapters. Policy recommendations will also be put forth to promote artisanal silk industry in rural West Bengal. The targeted objective of this research was to uncover hidden issues related to income, employment generation as well as to highlight the gender dimension of sericulture artisans of West Bengal, that were partially responsible for the tardy progress of the industry in West Bengal. Historical timeline affirms that West Bengal (the then Bengal) had a rich heritage in silk manufacturing since the fifteenth century. Malda, Murshidabad and Birbhum were the three districts where prosperity of this sector had been visible prominently since early eighteenth century. The present study has been based only on mulberry sericulture as this variety captures the lion's share of the entire silk production in West Bengal as well as India as a whole. In addition, the work remains confined upto the artisanal manufacture of silk fabrics which excludes the production of ready made garments. This artisanal phase includes rearing, reeling, spinning, twisting, throwing, degumming, bleaching, weaving and printing phase up to silk fabric production. Most of the raw silk and silk yarn produced in Malda district is absorbed in Benaras, Bhagalpur or Southern States like Karnataka and Tamil Nadu for weaving purpose and for manufacturing ready made silk garments. The weaving units in West Bengal are not powerful enough to utilize its entire manufactured raw silk and hence higher value-addition is created in the states outside West Bengal. This calls for a restructuring of policy incentives so that high quality silk weaving can be made in the state of West Bengal, too.

Chapter-2 chronologically deals with through different phases of the history illustrating the rise and fall of sericulture and silk industry in unified Bengal. The chapter illustrates the genesis of silk industry in China and its gradual spread over to Asia and Europe. In India history of silk can be traced to 15th century in Bengal, while the discovery of silk was around 2640BC in China. Genesis of artisanal silk industry in several nations across the world had shown its enormous power to connect distant nations of the world with its golden yarn. The countries traded with each other for this high valued silk yarn and smothered cocoon and the civilization progressed with this silk trade. Thus fashion statement of one part of the globe started changing the weaving pattern of silk of another part of the world and a global complementary pattern of production and consumption demand had begun developing. The East Asian countries (which includes China, Japan and India) were the principal suppliers of the raw silk while the same yarn and cocoon were woven in a new style in Italy, France, England for consumption as well as re-exportation to East Asian countries. Again the improved reeling technology and weaving pattern of the West percolated to the artisans and weavers of East, thus substituting rudimentary methods by technologically developed procedures.

Numerous historical legends and anecdotes of several nations were elaborated in the aforesaid chapter, with whosoever this royal yarn was attached to. The chapter also narrates how the mystery which was hidden from the world by China for several millennia through frequent administrative coercive restrictions had led to several fascinating legendary stories and how the secret of 'silk manufacturing' was stolen or transported to different countries in the world. The Silk Road itself became famous not only for transacting silk but for exchanging goods of different categories and the culture between East and West got entangled through Silk. Worldwide demand for this exotic fiber and its excessive value had prompted merchants across the globe to fill their coffer with silk. Later while discussing about the entry and venture of English East Indian Company especially in Bengal, the chapter

analysed how the Company strived hard to exploit the potentials of silk production in Bengal for their own commercial interest. British East India Company left no stone unturned to improvise the quality of silk by introducing filature technology from the West. However, the Bengal economy failed to respond due to several internal problems and natural calamities.

Chapter 3 illustrated how from mid of the seventeenth century (1635-50) silk trade in India started flourishing when the demand for cheaper Bengal Silk began to rise in European market. Dutch merchants were initially collecting silk from the Indian market for exporting it to European market and afterwards English East India Company (EEIC) took over the control of this silk trade spreading their own silk-filatures to different parts of India and within Bengal Presidency. The British traders realised that the cheaper variety silk could not retain their market status; so they had introduced Italian technology of reeling, known as Piedemontese Technology, in Bengal Sericulture in 1769. Bengal sericulture was never ideal for the specific technology and moreover Bengal economy at that period was going through several natural calamities and domestic disturbances. Even in the first half of the nineteenth century, silk trade was prospering at a commanding pace. From 1813, after losing of EEIC's monopoly over trade, the company started selling its filatures. However, the trade was still growing as the filatures were purchased by other British and Indian traders. The economic power of *dadani* merchant, money-lenders started growing from this period and they formed a new middle class while the situation of artisan and farmer class were worsening day by day. The condition of native artisans further deteriorated under the British Monarchy. The orientation of the monarchy was never in favour of promoting this industry which caused further fall of this artisanal industry. Bengal silk was worst hit than Kashmir and Mysore silk, since Mysore silk had undergone a process of revamping under Tipu Sultan. In the following years Karnataka became the largest silk manufacturing state in independent India.

Chapter 4 attempted to throw light on the initial four decades of economic planning in post independent period, when planners strived hard to restore the past glory of Indian silk. The Central Silk Board was established at the time just after independence and separate allocation for this silk sector was introduced from the Second Plan onwards. Multivoltine and cross-breeds were the most popular mulberry silk breeds widely chosen by the silk farmers in India possibly due to its easy technology and guaranteed returns. On the other hand, bivoltine silk is of superior quality and have higher demand in superior category of domestic powerlooms and in foreign markets. Rearing of this superior variety was introduced in traditional states like Karnataka, Tamil Nadu and West Bengal as early as in the 1970s, while Jammu & Kashmir used to cultivate only bivoltine silk due to its temperate climate. However, with the passage of time Tamil Nadu fared well than the rest of the traditional states and became the leading state for bivoltine production in 2011-12. In West Bengal, Nitsari multivoltine is largely popular across the sericulture rich districts and the state has only a negligible percentage of bivoltine silk production. The subsequent sections of this chapter also indicate certain grave issues relatd to the silk farmers and artisans, which include fluctuating price of silk cocoon and silk yarn, lack of region specific mulberry variety as well as inadequate coordination between technology or laboratory experiments and cultivation field, competitive import price threat from China, infrastructural bottleneck across the states etc. Some of these problems were so acute that they call for immediate intervention by the government. On one hand, the successful performances of non-traditional states are confined within few states of Maharashtra, Madhya Pradesh, Manipur and Uttar Pradesh, while traditional silk producing states progressed ahead. These substantial inequalities across the traditional and non-traditional states need to be reduced through judicious policy decisions. The demand for silk is growing all over the world while India itself is the largest market of this product. Therefore

policy restructuring should be attempted in appropriate manner so that India could be self reliant in silk production.

Chapter 5 attempts to delve into the issues of the fluctuating growth of the artisanal silk sector in response to the opening of the domestic economy as well as of the foreign developed economies with the abolition of quota under MFA. It has been observed during the post globalisation phase that annual growth rate in silk export earning has been diminishing at a faster rate, though domestic production of raw silk followed an irregular growth path. The decade following globalisation exhibited a fall in growth of domestic raw silk production mainly due to huge inflow of Chinese raw silk through the opening of the economy. China utilized that opportunity through dumping its product in order to capture vast Indian market. However, as anti-dumping regulations were imposed in 2003, as result of the unrest in the rearing and reeling sections, the landing fees of Chinese raw silk of Grade 2A or lower, which is considered to be high quality silk, became costlier in domestic market. This helped to protect the domestic production of artisanal raw silk to a greater extent, although there was a rift between silk reelers and weavers. The long standing statistically significant relation between domestic production and export was broken during the last decade, i.e., 2001-2010. This latest decade experienced miserable decline in export growth rate with high production rate. On the other hand, the import of raw silk has continued projecting a steady upward trend implying growing market potentials in India. Imported silk of higher quality is largely demanded by the powerloom sectors of the weaving sections in artisanal silk industry. But the persistent growth in import has led to a fall in the number of rearing and reeling artisans of the silk industry, which is evidenced through reduction in mulberry areas in post globalisation period and shutting down of reeling units, like charka, cottage basin and multi-end reeling machine. Withdrawal of quota regime from the developed country under MFA abolition could not cure Indian economy's balance of trade in silk and silk goods. China through its technological innovations was much ahead, pushing out India from the foreign markets. Silk merchants in India had chosen to adopt an inward looking approach by concentrating their production within the domestic territory under the protection of anti-dumping regulations. The quality bivoltine silk production is still confined within a few regions though an enormous emphasis and ambitious target has been set forth in XII plan. At present, Tamil Nadu is the most prominent state producing bivoltine silk followed by Karnataka and Jammu & Kashmir, while West Bengal fails to add any substantive value in this quality of silk. West Bengal has also been identified as a deprived state while analysing the regional inequality. Unless these regional inequalities are narrowed and trade-policies are streamlined, no major breakthrough in Indian artisanal silk industry is possible.

Chapter 6 focussed its analysis on the state of West Bengal , where sericulture has been identified as an important vocation providing employment and livelihood to more than 1 lakh families in the rural and semi-urban areas. The productivity level of sericulture (land and leaf) is not low compared to that of the major silk producing states in the country, which opens further possibilities of research by analysing its productivity. This chapter in a nutshell leaves an impression about the evolution of sericulture in West Bengal as a whole since from the inception of the planning period. A state level comparative study has confirmed that land based productivity is not hindering the growth of mulberry sericulture in West Bengal while progress of the artisanal silk industry reveals loopholes in several dimensions. Small holding capacity of the rural farmers and poor economic condition of the artisans have been identified as major impediments in the path of development of sericulture in West Bengal. The rural moneylenders as well as traders (*dadani mahajan*) utilize this to their advantage and extract a major part of the pay-off intruding into the supply chain of the industry. It has been found

that in Malda district approximately Rs. 10-12 crores of rupees are getting rolled as capital investment and source of this working capital lies with rural traders who ultimately claim a disproportionate value addition. The Central as well as the State government always concentrate on the extension of sericulture through acreage and production, ignoring this exploitation of the artisanal classes at each level of value addition in the supply chain. In the absence of institutional apathy and well linked credit system in these remote rural areas coupled with financial illiteracy of the rural artisans, the objective of development seems to be far away. The Twelfth Plan (2012-2017) especially focused on certain issues of sericulture as major goals or aspirations for the development of sericulture through rural reconstruction. Evolution of season and climate specific, disease resistant robust silkworm breeds has been given greater emphasis. The technology feasibility study in consultation with Central Silk Board and JICA (Japanese International Co-operation Agency) is already under process. Establishment of a Silk Park at Malda is also about to take place in the near future. Another important endeavour has been undertaken to link sericulture with major agro-based program like RKVY, MGNREGP, which are expected to bring better funds to this sector.

Chapter 7 makes an empirical analysis on income generating potential and employment creating abilities of the artisanal silk industry of West Bengal. The primary survey was accomplished in eight sericulture rich villages of Malda district using a structured questionnaire comprising the aforementioned issues and the information gathered the data provide sufficient insight to the understanding of the situation of the artisanal silk industry in rural West Bengal. The income generation process in rural sericulture has revealed the dynamism of the process of earning within the rural inhabitants. While in the broader national perspective, area of mulberry cultivation and price of reeling cocoons have been deduced as significant explanatory variables for upward rising slope in the 'income generation curve', the econometric study of the primary analysis in this most sericulture rich district of West Bengal exposes that number of man-days generated from different phases of silk-worm rearing activity actually influence the total income generation, which is very much logically justified. On the other hand, loans taken by the household farms (mostly from *dadani* merchants) and cost of machineries and implements have a statistically significant positive effect on income generation of the sericulture farms. This in a way establishes that rich farms that have the capacity to bear higher production cost have greater income generating power from this artisanal silk industry. With majority of the sericulture farmers being small farmers, income generating impact has been lower leading to a decline in the number of sericulture farmers and artisans in West Bengal during 2002-03 to 2010-11 (declined from 110,000 to 92,000 workers). However, the result also shows that loan seeking farms can enhance their income, which is a sign of hope for a large chunk of artisanal farmers in West Bengal.

From the employment perspective, West Bengal has been identified as relatively higher "families involved per village" compared to the other traditional silk producing states. But the recent trend explains a declining tendency in employment generation especially during the Eleventh Five Year Plan. Although higher levels of labour involvement do not necessarily assure higher levels of production all the time, it still reveals the possibilities of positive spillover effect that creates positive externalities in turn. Over the last decade, the growth in artisanal silk sector has also declined in respect of involvement of villages and families in West Bengal, which is presumably due to fierce foreign competition especially from China. The econometric study on the primary data collected from the sericulture rich bolcks of Malda district reveals that areas of mulberry cultivation, educational background of family head and total man-days creation have an inverse impact on the level of average employment generation in rural West Bengal. On the other hand, rise in household size and numbers of

male and female hired labour have positive impact on the average level of employment generation in a sericulture family farm.

The Directorate of Sericulture sets targets every year to stimulate the level of income and employment in this artisanal silk industry. However, difficulties lie in implementation. Increase in area of mulberry cultivation is shrinking in West Bengal, which can be identified as one of the major factors for slow growth of sericulture in West Bengal. Improved mulberry variety is to be planted with greater care using manures and fertilizers. Innovations and technologies need to be directed so that more output can be produced in cost effective ways. Quality yarn needs to be produced by the domestic farms so that Chinese aggressive market policy can be tackled. Irrigated lands have higher productivities and therefore greater stress should be given on expansion of the irrigation network. Cocoon markets are usually public market, though private cocoon-markets also exist on wider scale. Augmenting the number of cocoon markets and power-looms may be done with a little effort from the government. Credit facilities to sericulture artisans need to be made at discounted affordable rate so that poor farmers can easily adapt themselves with the rise in costs arising out of inflation trends.

Chapter 8 explains the issues relating to gender relations in family, child labour and the gender promotional role in Indian artisanal silk industry. In case of West Bengal, an econometric application based on primary survey data shows that higher percentage of female members in the household can raise the gender dominance of the sericulture farms and gender dominance is associated with higher level of female members in the household, wage of female labour and family empowerment of domestic women. But, when the size of household rises and greater number of male workers are being drawn to the sericulture farms, possibly due to higher returns, they push out the female workers from the working members' bracket. The welfare impact of a female dominated farm is always redistributed to different sections of the society and a gross level of up-gradation in nutrition and education level of the household is possible only through the spillover effect of female employment generation. Therefore, holistic level of development is possible via gender promotion only. Thus situational analysis of women workers in this sector provides a scope to review the actual condition of the working women in sericulture though there exists much hyped notions of female dominance and empowerment in women intensive industry like artisanal silk. Family Empowerment in household can be raised through rise in health, education level of female members of the households, which again reinforces their dominance in income generating household activities. Ensuring female education in remote areas and female health care in rural household (including their reproductive health) the government can make this breakthrough.

9.2 Policy Recommendations

There are certain critical areas which require specific interventions as noted and identified in this research study. The policy recommendations to promote the artisanal silk industry of West Bengal are provided below:

- The institutional apathy is the major weakness found in this sector, which needs to be rectified with immediate effect to revamp the artisanal silk industry in West Bengal. Rural affluent middlemen (dadani mahajan) seem to be the major controlling force behind the sericulture business in West Bengal. Presence of this vibrant profit seeking class is actually the reason for the dwindling of a large section of poor artisans. Poor

artisans suffer from lack of capital and due to financial illiteracy they get easily trapped in vicious loan-cycles of the *dadani mahajan*. Unless the credit system in the rural areas is strengthened to provide credit at low rate of interest, no dynamism through sericulture extension is virtually possible. Seasonal cultivation of higher intensity is possible when credit is available to the sericulture farmers at lower rate of interest. Along with the farmers of existing areas, credit should be adequately provided to the farmers of new areas for plantation, purchasing of rearing equipment, reeling equipment, construction of rearing and reeling houses. It would help in raising man-days and thereby would be able to increase the flow of income generation through sericulture practices.

- Directorate of sericulture has routine target program in extending mulberry areas, though with extension of sericulture farms inverse relation was found between sericulture income generations by the household. However, this can be interpreted as extension of sericulture in new areas where minimum gestation period is required to observe the desired return. Instead of putting higher weightage on extension in new areas the Government should put more emphasis on the rise in existing productivity level. Certain advantages in this parameter especially in the traditionally sericulture practicing districts of this State has already been gained. Innovations and extension work should be more streamlined to realize this beneficial impact in case of the state of West Bengal.

- The technical research wing of West Bengal, namely, Central Sericulture Research Institute, Baharampur should lay more emphasis to increase mulberry leaf productivity. With the passage of time land will be scarcer and therefore more emphasis should be given on productivities of silkworm breeds, mulberry leaf as well as of labour. Updated scintific training to the sericulture farmers and artisans can make a sea change. Most of the sericulturists in the rural regions of West Bengal gather their knowledge and skill from previous generations. If this generation based wisdom can be combined with recent technical know-how, then a real break through is possible even in the rural arena.

- Free training program should be made compulsory for artisans in this field. This can improve the impoverished situation of the rural farmers to a great extent.

- By raising levels of education and health status, potential of women-power especially from the disadvantaged and minority communities can be stimulated. Vocational training on sericulture can be introduced in the neighbourhood schools of the sericulture rich village areas. This can raise the potential of women from an early age and proper training can make them more aware of the recent technological upgradation.

- Gender based wage differential in the unorganized sector should be legally banned. Government should take affirmative actions to stop this gender based exploitation.. Spillover impact of women workers always has the potential to boost up the welfare level of entire household. Initiation of development dynamism in rural West Bengal through empowerment of the women in artisanal silk sector can not be undermined by the policy makers.

- Infrastructural stagnation has been identified as one of the major hurdles at the pace of progress in West Bengal sericulture. Number of Chawki Rearing Centers (CRC) should be increased where young silkworms requiring utmost care are brought up in hygienic conditions under strict surveillances of technical staff of the Sericulture Department. This will raise the level of quantity as well as quality in production of raw silk.

- Institutional measures should be taken for sericulturists in new areas by providing high yielding variety of mulberry leaf at free of cost. Replacement of local variety through high yielding variety can raise the level of productivity on one hand and on the other hand it can encourage the rural mass to take up sericulture as a return assuring livelihood opportunity.

- Training should be provided to the young sericulturists both in silkworm rearing and silk reeling including the artisans in the new areas. This is expected to raise artisanal productivity. Like Karnataka, Department of Sericulture, Government of West Bengal should think about providing cash subsidy to sericulture artisans which can upgrade the technical know-how of the young sericulturists especially in the new areas and may raise the income earning opportunities in those areas.

- Since silkworms are vulnerable to several types of diseases, a proper check is to be ensured to control the spread of diseases especially at the stage of supply of layings. As a matter of fact, Central Sericultural Research & Training Institute, Baharampur (located in Murshidabad district) is supposed to take care of this supervisory activity. But in practical sense the impact is hardly feasible which calls for revamping of extension activities by the CSR&TI, Baharampur. Disinfectant supervisory squads should be made more organized to control these diseases which arise periodically depending upon the environmental conditions.

- Greater number of grainages should be established so that capacity to produce improved quality of disease free layings can be raised. This would be translated into greater quantity of quality raw silk generation in return, which can ameliorate the impoverished situation of poor sericulturists.

- Increase in the number of Technical Service Centers (TSCs) can also assure higher transfer of technical know-how from the laboratory to the sericulturists on the field. Activities of TSCs should be monitored in a routine manner so that a gross level quality improvisation can make a real breakthrough in sericulture.

- Mobile units to aid in the extension work especially in the new areas need to be introduced. There should be training schools in every potential block of the districts of West Bengal, which can provide pre-service and in-service training facilities to sericulture farmers and artisans.

- Government should think of setting up more filature in the sericulture rich districts of West Bengal to raise the quality level of the reeled silk. Multi-end reeling machine also produce superior quality of silk though the common artisans can hardly afford to purchase such an expensive reeling machine. The government should provide funds/credit to the co-operatives of the reelers so that the advantage of this reeling machine can be collectively derived.

- Sericulture artisans of West Bengal largely need greater number of cocoon market yards which can protect the reeling cocoons brought to the market from sun and rain. This can stop the volume of damaged cocoons and would be able to realize greater income for the reelers.

- The introduction of 'research and training of sericulture' as a vocational course in at least one district college is strongly recommended to support and reveal the potential hidden among masses. Sericulture Development Cell of the concerned State Department should work in perfect synergy with these vocational training centers so that maximum outreach activities can be generated.

- The number of regulated markets for reeling silk is to be increased to restrict the plight of the local reelers, who are always at the mercy of unscrupulous money lenders. Unless these evil effects are restrained, redressal of distress of the cocoon growers and silk reelers would remain as a pipe dream. Through the establishment of more numbers of Silk Exchanges, the government can protect the interest of both silkworm rearers and reelers.

- The silk weaving sector is weak in West Bengal which ultimately leads to flowing out of silk to outside markets like Benaras, Bhagalpur , Mysore, Kanchepuram and so on. The silk weavers are being adversely hit by the anti-dumping regulations imposed by Government of India against Chinese raw silk. Government should provide temporary incentives to the silk farmers so that greater numbers of silk clusters can be operated in the state of West Bengal. Mushidabad silk, Baluchari silk are few branded silk apparel which uphold the status of West Bengal. The government should take serious steps to improve the situations of individual weavers who are subject to exploitation by the local silk merchants.

- Although silk weaving is supposed to be a crucial link in the supply chain, it is one step below the ultimate consumer. Most of the weavers who work under Master Weaver receive abysmally low wage. This miserable situation of the weavers needs to be prevented. Government must intervene in the contractual relation between the Master Weaver and individual weavers to safeguard the interest of the poverty stricken artisanal class.

- The local weaving organizations and co-operatives are all mostly loss making organizations. In order to revamp the silk weaving sectors, the government needs to support this loss making farms.

- Gender discrimination against women workers should be eradicated, which requires good governance. The Women's Rights Commission may adopt positive roles in this direction. More incentive schemes (like concession in taxation, etc.) can raise the involvement and recognition of women workers in sericulture farms. Women workers dependent sericulture farms require some primary institutional support and initiatives so that sole-women household members can survive and sustain this livelihood. Women workers in West Bengal as a whole should be given proper recognition. Then only their rights can be ensured. Low levels of education and low skills have obstructed their inner potentials to come to that often. Sericulture opens up a vast

scope for them to extend their work abilities and expand their participation domain. Institutional support requires to be extended to these poverty stricken rural women and they should be encouraged to adopt sericulture as the primary source of earning..

However, all these will be mere rhetoric unless the gap between policy suggestion and actual implementation is eliminated. Therefore, restructuring the process of implementation is also urgently required at the same time. Then only the status and existence of the invisible, unrecognized and unremunerated women workers can be promoted. Drastic change in the mind-set is also required while implementing equal remunerations and ensuring female dominance in farms. The Equal remuneration Act of 1976 should be seriously adhered to and ensured by local governance. Presently, monitoring and reviewing of the employment scenario in case of sericulture has become imperative. Socio-economic regional policies have to be remobilized in such a manner that various government policies and schemes to promote women's social and economic welfare may be dovetailed to maximize such gains in welfare of women workers in this sector. This only can address the poverty situation of the workers and empower them to have a voice of their own.

The research work provides the scope for further research of this woman intensive rural activitiy that can bring-forth greater development dynamism for the state like West Bengal whose location in the development ladder is still not up to the mark. Sociological studies have enormous scope in this filed where power distribution in a women working family is being counted in many different ways. A substantial level of child involvement in this domestic work has been observed, which is beyond the scope of analysis of this research study. Though sericulture has not been defined as a hazardous work but engaging family child labour is equivalent to depriving them from their labour free childhood and educational opportunities. This calls for a separate analysis which we can be undertaken as a future research exercise by any aspiring social scientist.

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Appendix. A SURVEY QUESTIONNAIRE

SOCIO-ECONOMIC SURVEY ON ARTISANAL SILK INDUSTRY
IN MALDA DISTRICT, WEST BENGAL
(RESEARCH PROJECT UNDER UNIVERSITY OF NORTH BENGAL)

Schedule No…….. Survey Area……..
Date……..

A. General Information

1. Name of the Respondent……
2. Age…….
3. Religion : Hindu/ Muslim/ Others
4. Caste : SC/ ST/ OBC/ Minority/ General
5. Education Level : Illiterate / Up to Primary Education / Up to Madhyamik/ More than that
6. Training in sericulture : yes/ no
7. Household Structure : Unitary / Joint
8. Primary Occupation : Rearers / Reelers/ Twisters / Weavers / Traders
9. Secondary Occupation : Nil / Wage Labour / Others
10. Earning Status : Principal Earner / Joint Earner
11. Marital Status : Unmarried / Married / Widowed / Separated & Divorced
12. Verbal Communicative Skill : Bengali / Hindi / English
13. Household Description

Category	Male	Female	Total
Household Size			
Minors (<=14yrs)			
Earning Minors			
Dependent Elders(more than 60			
Non workers			

14. Area of Land possessed ……. (in hectare) / Landless
15. Use of land : Mulberry Cultivation (…..hectare) / Other Crops ……..(Name & hectare)
16. Original Resident / Migrated Workers from (……..place)
17. Number of members in family out-migrated in last 5 years
    a. Male / Female
    b. For working / nuptial reason

B. Social Impact of Trade Liberalization

1. Did you buy Chinese yarn in last 5years Yes / No
2. Price of Chinese silk yarn…….. & Indian silk yarn……..(Rs)
3. Total amount of Chinese silk yarn you have purchased last year……. (Rs)
4. Total amount of loss you incurred in last year due to yarn-import…… (Rs)
5. Any quality control exercise done in farm….Yes/ No
6. Ultimate destination of your product -domestic market/ foreign market/don't know
7. Trend of imported Yarn purchase in last 5 years: Increasing / falling
8. Impact due to Silk Import
    a. Production of (raw-silk/ yarn/cocoon) increased / decreased by…… (amount) in last 5 years

b. expansion / closure of reeling unit/ weaving machine due to cheap import by …….. units

9. Any bulk order of higher grade exportable silk you received in last 5 years …….. (value)……. (amount)

10. Have they become better-off / worse-off due to trade liberalization compared to earlier periods?

11. How much change in wage rate has happened due to open trade? Rs. ……(rise/fall)

C. Income Generation

1. Total income generated in last year…… (Rs)
2. Any fall/ rise in income level……(by what amount than previous year)
3. Income sources (in last year)
   a. Sales of Egg : rate…… amount sold……
   b. Sales of cocoon:. rate……. amount sold…….
   c. Sales of silk yarn: rate…….amount sold……
   d. Sales of silk cloth: rate……. Amount sold…….
   e. Sale of finished silk product: Rate……. Amount sold…..

4. Total number of family members worked in last year
   a. Male…….. b. Female……..
5. Total number of hired workers used in last year
   a. Male…….. b. Female…….
6. (a)Daily Wage paid to hired worker …….. (Male)
   …….. (Female)(cash/kind)
   (b) Daily Wage hour…….. (male)…… (female)

7. Approx. days of hiring workers in last year……..(male)……..(female)
8. Total value of raw materials he/she purchased last year……..(Rs)
9. Total amount of loan received from private money lenders last year……(Rs)
10. Total amount of loan received from bank in last year……(Rs)
11. Subsidy from Government received in last year ……..(Rs)

D. Employment Impact

1. Number of employed workers in family……. (male)……..(female)
2. Education level of Children :……(male)…….(female)
3. Height of Children…….(male)…….(female)
4. Weight of children……..(male)…….(female)
5. Major disease of children in last 5 years…….(male)……..(female)
   (Malaria, Cholera , diphtheria, pox, Jaundice etc)
6. Self expenditure borne by the female members in last month…… ….(amount in Rs)

7. Employment category (last year)
   (a) Rearer
   (i) Amount , value of silk eggs purchased……..
   (ii) Amount & Value of Mulberry Leaf purchased…….
   (iii) Amount / value of silk cocoons sold……..

   (b) Twister / Reelers
   (i) Amount & Value of cocoons purchased……
   (ii) Amount & Value of silk yarn sold…….
   (iii) Number of reeling machine…….

(c) Weaver

(i) Amount & Value of silk yarn purchased……

(ii) Amount & Value of silk cloth sold……..

(iii) Handloom / Powerloom……. (numbers)

(d) Trader

i. Amount of silk cloth purchased……..

ii. Amount of finished silk sold……

E GENDER PROMOTION

1. Total female workers worked in last year…….
2. Domestic female worked……..
3. Hired female worked……..
4. Wage rate…….(.Male)… ……..(Female)
5. Education level of hired workers…….(male)…….(female)
6. Education level of domestic female workers…Illiterate/ classIV/ Madhyamik
7. Number of widowed/ separated female worker
   (i)……..(domestic); (ii)……(hired)

8. Number of female workers who are migrated workers
   (i) ……. (domestic, for marital reason)
   (ii) ……(hired for marital reason/ job search)

9. Landless women / Women below poverty level
   (i) ……..(domestic)
   (ii) …….(hired)

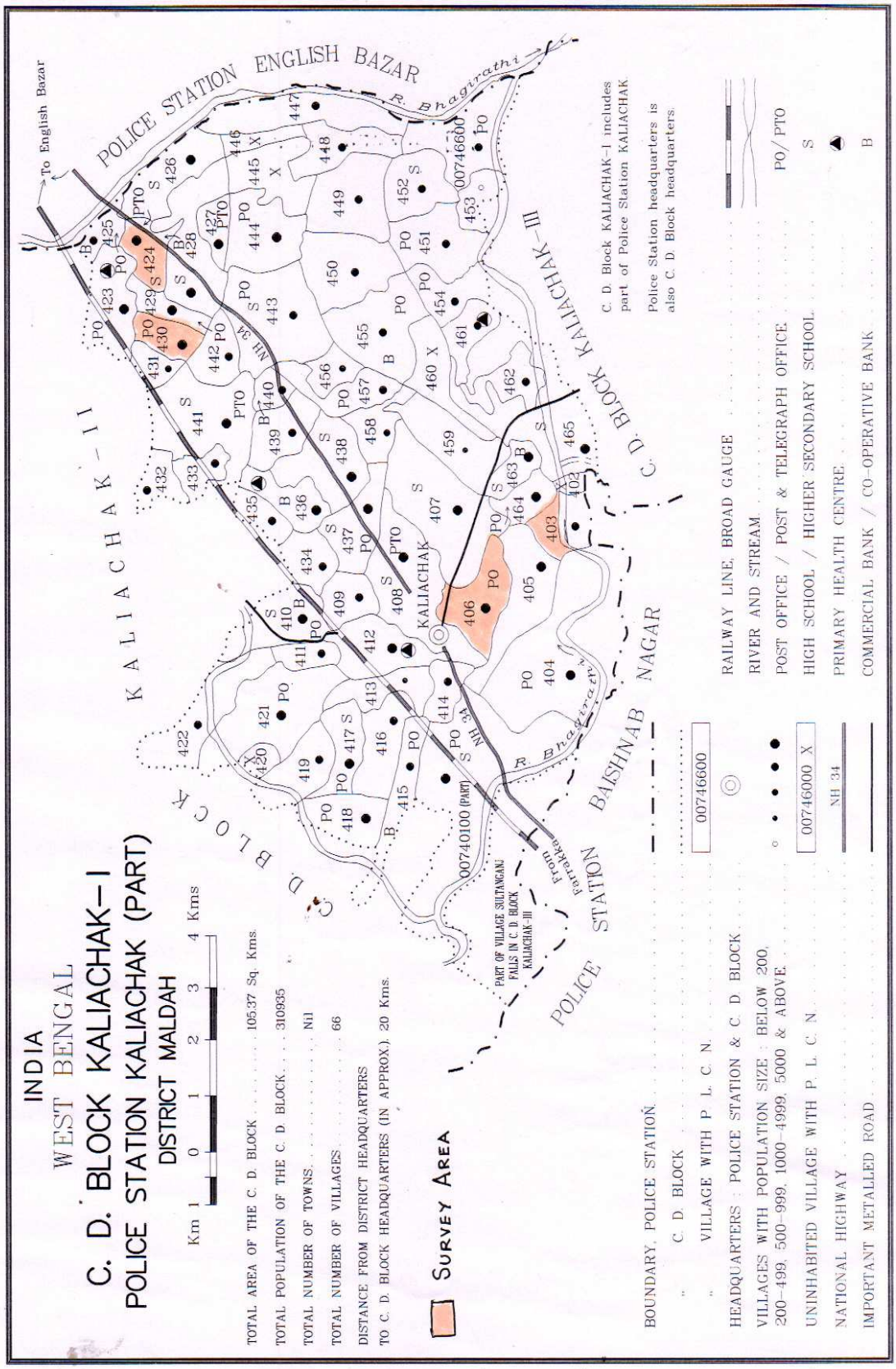
10. Credit (access) received by women in last year…… (value)
11. Training received by women in last year …….yes/ no
12. Alternative work by women workers
    (i) Domestic……. Daily Wage rate…….
    (ii) Hired……..Daily Wage Rate…….
13. Major disease in last 5 years….malaria/ tuberculosis/ pox/ diphtheria etc.
14. Participation in Household expenditure…. Yes/ No
15. (i) Amount of total monthly expenditure of family……..
    (ii) Amount of expenditure after education……..
    (iii) Amount of expenditure after food……
    (iv) Amount of expenditure for female child……..
    (v) Amount of Income saved…….

F. PROBLEMS IN MARKETTING & INDEBTEED NESS

(i) Value of unsold product in last year……..(Rs)
(ii) Amount of loans received by Money Lender last year……(Rs)
(iii) Amount of debt to money lender…….(Rs)
(iv) Amount loans received from bank……(Rs)
(v) Amount of loans paid back till date……..(Rs)
(vi) Value of product sold to private traders / cooperative society;
(vii) Self invested value of capital in last year…….(rs)
(viii) Profit / Loss incurred in last year…….(rs)
(ix) Distance of input market from residence……..(km)
(x) Distance of output market from residence……(km)
(xi) Electricity facility in residence……..yes/no
(xii) Irrigation facility in agricultural land used in mulberry cultivation yes/ no

(xiii) Production of mulberry leaf.....(kg)
(xiv) Production of cocoon……(kg)
(xv) Production of raw silk……..(kg)
(xvi) Production of silk yarn……..(unit)

APPENDIX B1



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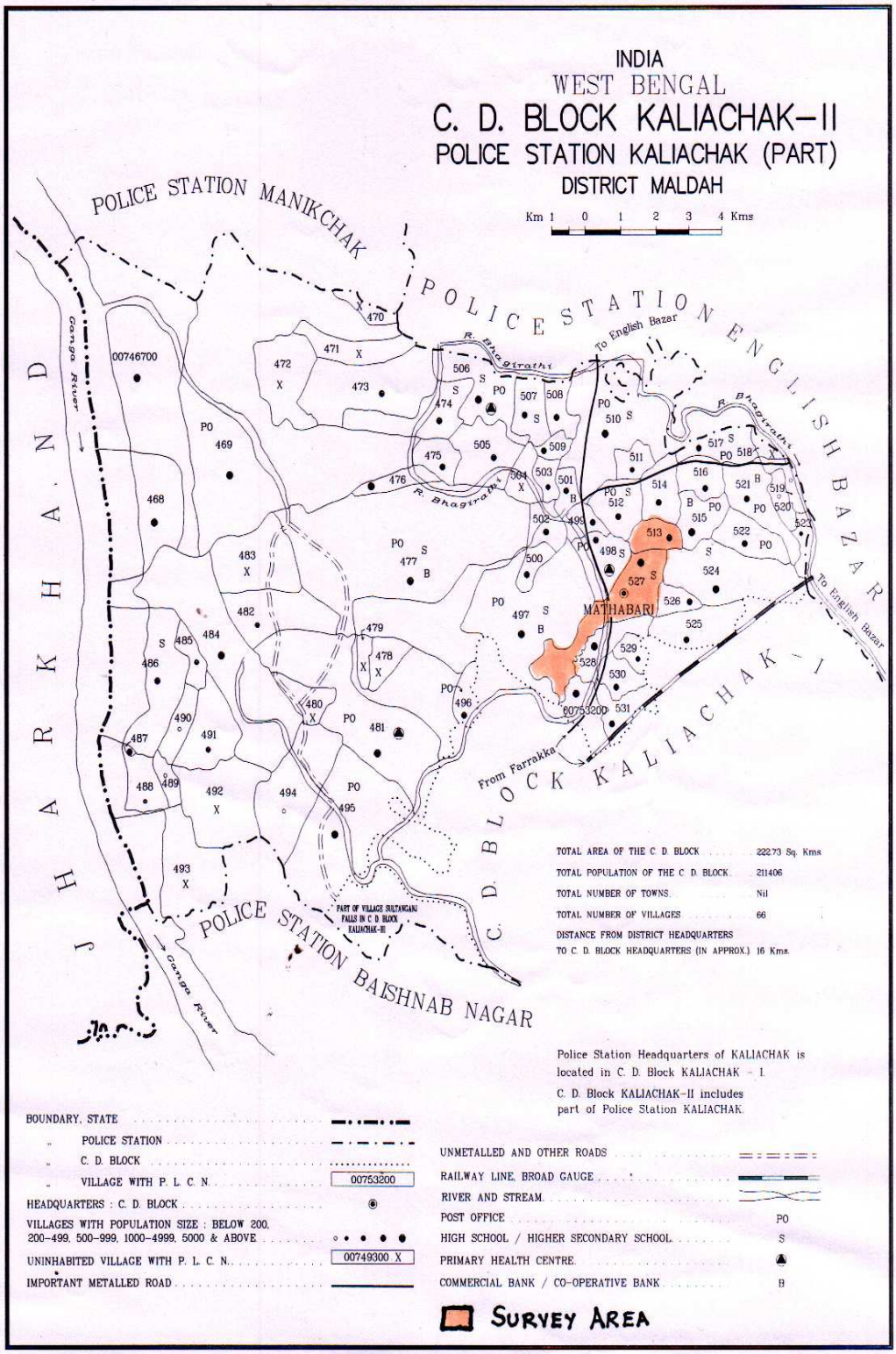
APPENDIX B2



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