

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 path². 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 Zhejiang 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 India⁴.

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 1877⁵ (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 Emperor⁶ and Sassanid Empires of Persia survived the collapse of the classical age of long-distance cross cultural interactions

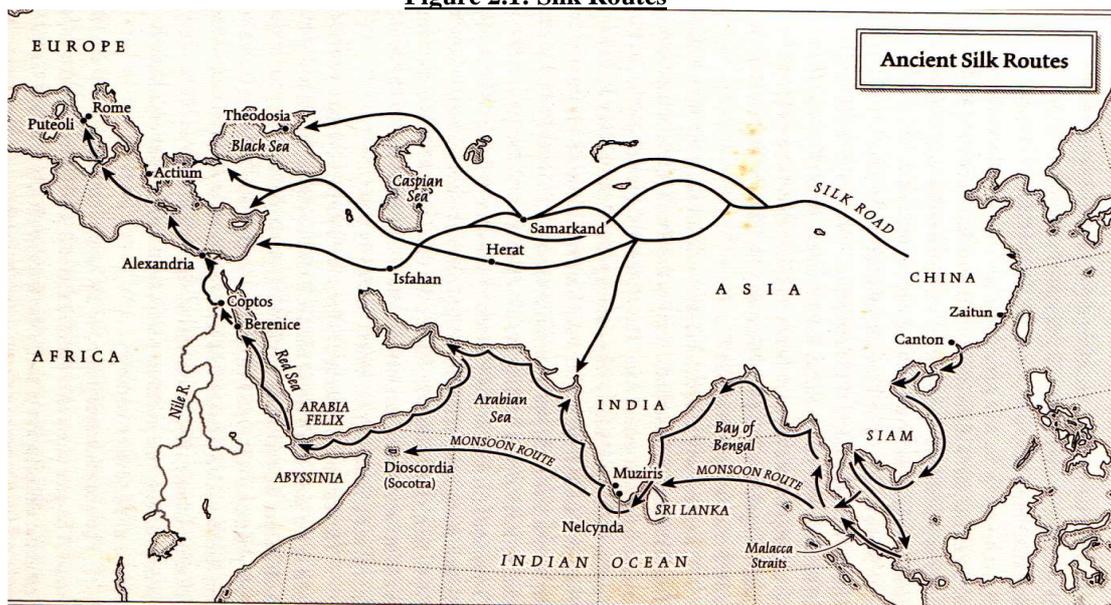
between China under Han Dynasty and Roman Empire. Eventually trade relation between Persia and Byzantium⁷ flourished where silk was the major item of transaction (Bently, 1966). One of the most important developments during 400-600 AD was that growth of a large silk trade stimulated the establishment 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 River⁸ 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 Ho⁹ 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 <i>Bombyx-Mori</i> 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. 8 th Century		Silk weaving brought to Spain by Arab conquest (Edler 1930)
c. 9 th Century	Sericulture brought to Sicily (Italy) (Edler 1930)	
c. 10 th 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 12 th and early 13 th Century		Silk weaving took root in North Italy, specially in Lucca (Edler 1930)
14 th Century	Sericulture spread to North Italy	Silk weaving in France and Cologne,

	(Edler 1930)	Zurich, Giret (Edler 1930)
15 th Century		Silk weaving started in England (Edler 1930)
16 th 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 Yonezawa 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 Kyoto'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 throughout 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 Tokugawa 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 Morikuni¹¹. 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 Koguryo'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 Chiang, which many of the scholars considered as earliest civilization of South Korea. Excavations in the villages of Baan Chiang 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 Ekatsarot 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 had 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 zoomorphic motifs of Mudmee Thai Silk have been handed down for centuries. 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 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 Bowring 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 Chulalongkorn 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 Han¹³, Lac Viet's (northern Vietnam) 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 flourished. 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 van¹⁴. 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 from 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., in 1923), 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 Paulo 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 do 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%20America%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 Julius Caesar (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 Elagabalus¹⁰ 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 reign 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-loom. 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 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-diaminoaniso	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 varieties 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. Elagabalus 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: l'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.