Social Science Spectrum ISSN 2454-2806
Vol. 1, No. 2, June 2015, pp. 127-141

Growth and Development of Artisanal Silk Industry in West Bengal during Post Globalization Period

Chandan Roy[*] and Sanchari Roy Mukherjee[#]

Abstract

Artisanal silk industry, being low-capital intensive with low gestation periods and assured returns, suits a vast marginal class including landless farmers, low-skilled artisans and rural women with low opportunity cost of getting employed elsewhere. However, despite having high land productivities and generation-borne technical skill, artisanal silk industry is dwindling in West Bengal. The paper tries to focus on few pertinent issues of West Bengal's silk industry where land-productivity is diminishing along with huge exodus of sericulture workers in the post globalisation era. Primary survey on Malda district of West Bengal exposes that cost of raw materials, loans taken by the artisans irrespective of its sources of collection and man-days creation for this vocation are significantly enhancing annual income flow generated by the sericultural family. In order to improvise this situation an effective institutional effort is required so that poor sericulture farmers can receive sufficient credit benefit to sustain this rural industry. All the extension work needs to be synchronized, intensive and time-bound so as to sustain this age-old artisanal cottage industry in this post-globalisation era.

Key words: Sericulture, Income generation, Silk artisans, Globalization, West Bengal

I. Introduction

Sericulture, being a low capital intensive agro-based industry, generates a continuous stream of income within rural India throughout the year. Along with the allied activities it ensures secured livelihood to more than7.5 million persons in and across 59 thousand villages over India (ISC, 2014). In the face of rising poverty and inequality with the impact of globalization, sericulture has become one of the promising and ideal rural income generating sectors due to its minimum gestation period, less investment requirement and maximum employment generating potential with quick turnover.

In the post globalization period, when the major allegations against the development procedure is that it hardly includes the marginal section of the rural sector, sericulture unambiguously ensures an avocation to those semi-skilled poor peasant-artisans whose struggle for survival has become challenged in the face of exclusionary level of development. In order to overcome this economic and social exclusion in the fast changing globalizing world, a high-level ECOSOC (United Nationôs Economic & Social Council) Ministerial Meeting was called at Jeneva on July, 2007. It was inferred through the discussion that if growth and development were to accelerate and lead to a faster pace than poverty and hunger, a major effort is needed to generate productive employment. Therefore productivity is one of the important criteria which were assigned as a poverty reducing agent.

This paper will deal with the impact of productivity as an income generating factor in the artisanal silk sector of West Bengal. In one of his earlier studies, Lakshmanan (2007) showed that West Bengal being one of the principal originators of silk-industry in India, has successfully raised its raw silk production during 1980-2004 with a positive annual growth rate of 4.16 percent and the

[*] Chandan Roy, Assistant Professor, Department of Economics, Kaliyaganj College, West Bengal, India. Email: *chandanroy70@gmail.com*

[#] Sanchari Roy Mukherjee, Professor, Department of Economics, University of North Bengal, West Bengal, India. Email: sancharirm@gmail.com

annual growth in mulberry area during the same period has been 1.83 percent, which implied a growth in land productivity with the passage of time. This higher growth in level of raw silk production compared to that of mulberry cultivated area is also indicative of a vertical growth of sericulture in West Bengal instead of horizontal extension. Sericulture is practiced in few concentrated regions of West Bengal compared to other traditional silk producing states (e.g., Karnataka, Andhra Pradesh, Tamil Nadu and Jammu & Kashmir) which is evidential from its highest number of sericulture families per village ratios (i.e., 48.9 per cent in West Bengal). In Karnataka, Andhra Pradesh and Tamil Nadu, sericulture activity is more dispersed throughout the state which is reflected through its sericulture families per village ratios, i.e., 14.29 per cent, 13.32 per cent and 5.26 per cent respectively (CSB, 2003). Therefore spatial concentration is a special characteristic of West Bengal which would lead to the development of a specific region due to this livelihood.

In the post globalised era (1991- 2011) rural income and employment generation has received top priorities to combat the trend of increasing inequality and poverty (Misra, 2010). In sericulture, the entire range of activities generates a moderate flow of income and creates employment opportunities for a substantial section of low skilled marginal rural inhabitants who would otherwise remain unemployed or disguised employed in vast agricultural sector. The entire sub-sectors include (i) silkworm rearing sector; (ii) cocoon producing sector; (iii) post cocoon sector. These sectors are farm-labour based and fall under the cottage and small scale sector. In silkworm seed sector, mulberry cultivation creates employment on farm. The silkworm rearing sector uses mulberry leaves as input and this creates large scale employment and income earning capacity for the family of mulberry growers (Eswarappa, 2009). Reeling activity is mainly undertaken in rural or semi-urban areas and that also generates a stream of income and employment. Thus, the artisanal silk industry creates large scale income generation opportunities in the rural and semi urban areas.

The objective of the current paper, against this background, is to derive whether this income generation is translated into increase in land as well as labour productivity which can support this cottage based industry to survive in this post-globalisation era. We will illustrate the national scenario in the beginning to measure the nature of association between input productivities (specifically land and labour) and income generation in order to assess whether the employment generation is productive or not. Then we will focus on regional analysis, specifically on the sericulture-rich districts of West Bengal.

Sericulture in West Bengal still remains an unimproved rural based activity dependent on low-skilled labourers, compared to those of other traditional silk producing states, like Karnataka and Andhra Pradesh, mostly due to differentials at productivity level. Experts in this field opined that there exists a significant gap in productivity at farmersô level and yield potential in West Bengal (Bagchi et al., 2008). Major reasons for low acceptance of the technologies were identified as inadequate linkages between scientist and farmers which are not being in consonance with the farmersô need and compatibility with the total farming system. Corporate entry in this sector is still a distant dream and the authority support is at barely low level much from its deserving threshold which resulted into this productivity gap at farmersô level and yield level. The obvious outcome becomes exodus of sericulture-artisan from the sector and looking for alternative employment opportunity.

However, the opportunity that lies with this sector is in its income effect associated with the large section of downtrodden artisans who could in turn generate a large spillover-effect over the society as a whole. Low gestation period and quick turnover makes sericulture ideal for poor and marginal rural inhabitant. Poverty and income inequality can be harnessed if expansion of sericulture can be sustained in the rural sector. It has been observed that in sericulture 57 per cent of its final value is flown back to the primary producers[1]. Again according to Mattigatti (2000) the

[1] See Gangopadhyay (2008). *Silk Industry in India: A Review Indian Science & Technology.* New Delhi: NISTDS, CSIR.

price spread of sericulture goods accounts 48.4 per cent for the mulberry farmers-silkworm rearers, 17.7 per cent goes back to reelers & twisters and 12.3 per cent goes back to weavers and dyers. Thus, sericulture supports in promoting growth of income level of the excluded group and justifies our prioritization of analysis in the realm of creating productive improvement and income generation.

II. Productivity-led Income Generation in Sericulture: Literature Review

Income generation at regular intervals inspires the low skilled poor farmer-artisans to adopt sericulture along with other cultivation of crops in India. Kumaresan & Prakash (2001) selected few areas of Tamil Nadu to make a comparative income analysis of mulberry crops vis-à-vis other competing crops like, paddy, sugarcane, turmeric, ginger and groundnut in that area. The crops cultivated other than mulberries are all annual crops with 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 occupied around 42 per cent of the cost share in mulberry cultivation. Farm manure and fertilizers were the other major cost components in cultivation of mulberry. Labour was the prime input in silkworm rearing too. It occupies around 55 per cent of the total rearing cost. Therefore, as a whole they explained that the share of labour cost in total leaf production and rearing cost was 50 percent. Given this situation if the labour productivity was raised the consequences of that rise would be reflected on the rise in level of income generation[2].

Similarly at Virbarha region in Maharashtra, a study was conducted in two villages by Hajare & Jadav (2008) to find out the economic viability of sericulture across other crops like paddy, soyabeen, and sunflower. The comprehensive report of their study revealed comparative advantage of cultivating sericulture over other crops, when flow of income generation is the consideration for sustenance of any crop[3].

According to Sinha (1989), roughly 30 per cent of the value of a printed silk saree 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 per cent or more and 12.5 per cent is accrued by the weaver leaving 22.5 per cent to the printing. Thus, total cost of production accrues to 75 per cent while 25 per cent is accrued by the traders. Hence, sericulture has the potential to steer pro-poor growth in a developing economy. According to another study report (Anantha Raman et. al., 2007), out of total share of income distribution in the sericulture sector, 54.6 per cent share is captured by primary producers like farmers, silkworm growers, while the income shares accounted by the traders, reelers / twisters and weavers are 17.8 per cent, 15.3 per cent and 12.3 per cent, respectively[4]. 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 fields 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.

The reeling activity involves a large semi-skilled labour force in rural or semi urban areas. The income generation opportunities emerged through this sector help to combat the rural poverty on one hand and prevent the involuntary migration of rural people to the urban areas in search of new job opportunities (Gangopadhyay, 2008).

The small and marginal farmers are more associated with sericulture because of the inherent labour intensity and adequate personal care which is urgently required for silkworm

[2] See Kumaresan et al. (2001). Comparative economics of sericulture with competing crops in Erode district of Tamil Nadu. *Indian Journal of Sericulture* , 40(2):142-146.
[3] See Hajare et al. (2008). .*Indian Silk*, 46(9).
[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.

rearing operations. 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 cocoons) 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. The labour force used by the small farms is mostly from family labour, which protects the small scale rearers against high market wage rate on one hand and makes their process of production more care-intensive on the other hand. The studies conducted by Hanumappa & Erappa (1985), Lakshman et al. (1998), Kumaresan & Prakash (2001) also indicated more involvement of family labour.

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 on hired labour and higher market wage rate also act as stimulating factors 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.

Dhane & Dhane (2004) explained that the income generation process of the silkworm rearers is threatened by some significant supply-side constraints, which include several types of inefficiency starting from technological inefficiency, cost inefficiency, labour inefficiency and market inefficiency. 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 pattern in the villages has been dismantled. Caste hierarchy has been demolished by the lower caste as sericulture has brought all the groups at a level playing field to compete with each other.

However, it has been observed that comparatively less significant research work has been done regarding income generation issues in sericulture of West Bengal. Ali et. al. (2008) have worked over the mulberry cultivation pattern of Malda district in West Bengal and revealed a grim picture. They have commented that technological inefficiency has blocked the income generation growth in sericulture of West Bengal, where scarcities of underground water and unpredictable rainfall have been identified as problem enhancing factors for mulberry cultivation. De Sarkar et al. (2013) have shown how sericulture can be used as a tool for economic development in Malda district. They estimated how the income generation has been doubled through sericulture during 2008-2010, raising much hope for the silk artisans in Malda district.

III. Objective and Methodology

A gap in research work on income generation issues in sericulture has been observed, especially during the phase of post globalization decades (1991-2011). Period of globalization has shaken the indigenous technology based sericulture sector in all traditional silk producing states, including West Bengal. The annual growth rate of silk production has abruptly declined in West Bengal mainly due to inflow of cheap silk yarn in the market. But the period 2000-2010 has experienced a revival in growth pattern. This drives our research interest to find out the significant income generating factors of sericulture sector in West Bengal, especially in the post-globalization period.

Methodology

The analysis has been initiated through studying the trends of income generation from raw silk and reeling cocoon at national level. It is studied with the help of secondary level data published by the Central Silk Board (1999, 2003, online) as well as DGCIS, Calcutta (online).Then the paper will concentrate on the analysis of the equivalent regional issues applicable in West Bengal. As analytical tool the paper will hinge on descriptive statistical tools like rank correlation

between associated variables and comparison of relevant CAGR (compound annual growth rates) between various parameters to study the growth patterns between pre-and post globalization phases.

Primary survey area

Malda district, which produces 74 per cent raw silk of stateôs production (see table 9) and 6 per cent of national production, has been chosen as the primary survey area of this study. Malda is called the ógateway of North Bengalô and situates between the latitude ranging from $24^0 40' 20''$N to $25^0 32' 08''$N and the longitude ranging from $87^0 45' 50''$E to $88^0 28' 10''$E. It covers an area of 3,733.66 sq. kilometres with a total population of 3.98 million (according to 2011 Census). It has been identified as one of the most backward districts of the country and currently receiving funds from Backward Regions Grant Fund. Silk and jute manufacturing are the principal livelihood options of this district besides mango cultivation.

For primary survey purpose, few sericulture rich villages of Kaliyachak Block-I & II have been chosen since mulberry cultivation in Malda district is mostly localized in these two blocks comprising 90 per cent of the total mulberry cultivation area. Kaliyachak-I itself occupies 61 per cent of the total cultivated area under mulberry in the district (Ali et. al., 2008). 20 per cent of total sericulture farmers of the district live in this block (Official Statistics, Deputy Director Malda, 2010). Kaliachak-I is a Community Development Block under Malda Sadar Division. It is located at $24^0 48' 11''$N, $88^0 01' 44''$E with an area of 106.60 sq kilometres with population of 310,821 (according to 2001 Census), while Kaliyachak-II is the other CD Block under Malda Sadar Division with 209.17 sq km area and 211,533 population (according to 2001 Census). It lies at $24^0 57' 49''$N, $88^0 05' 22''$E.

Sample size and technique

The sampling frame for this study comprised of all the sericulture artisans (including sericulture farmers, silkworm rearers and silk reelers) in Kaliyachak-I and Kaliachak-II CD Blocks of Malda district. The primary data used for this study were collected from the silk artisan households, who were selected using multistage sampling. In the first stage, Kaliyachak-I & II CD Blocks were chosen as sampling units. In the second stage, nine villages (namely, *Gayes Bari, Sujapur, Mothabari, Marupur, Alipur, Sershahi, Feranchak, Joshkabil)* were randomly taken from these two blocks. The last stage involved stratified random selection of 20-25 sericulture households of each village and thus a total of 212 respondents were ultimately chosen.

Pre-tested structured questionnaire was used to collect data regarding various related issues of income generation from these silk artisans. Then the collected data were fitted in a specific óincome-generation modelô and regressed.

Income generation model

The income generation function for the silk artisans in the study area can be specified as follows:

$$\ln Y_i = b_0 + b_1 \ln x_{1i} + b_2 \ln x_{2i} + b_3 \ln x_{3i} + u_i$$

where,

Y_i = Annual income generated by sericulture household farm-i;

ln = Natural Log;

x_{1i} = Annual cost of raw materials and implements used by sericulture household farm-I;

x_{2i} = Annual loan assistance (related with silk manufacturing) received by the sericulture household farm-i;

x_{3i} = Total annual man days utilised by the sericulture household farm-I for its silk manufacturing operation;
b_0 = Constant;
b_1, b_2, b_3 = coefficients of parameters to be estimated;
u_i = Error term;
The estimated coefficients will be interpreted in Section V.

IV. Income Generation Trends in Indian Sericulture: Pre & Post Globalization Periods (1983-90 & 1991-2012)

Globalisation of the Indian economy in 1991 virtually reduced and removed barriers between national borders and free flow of silk and silk yarn has eroded the position of domestic industry. Reeling industry was hard hit as the Chinese silk yarn was both cost efficient and qualitative. According to a study report (EXIM Bank of India, 2002) India imported raw silk from various sources to meet its requirements for production of silk fabrics. These imports were necessary to meet domestic as well as export demands for various silk products. In 1990-91, the domestic sector contributed around 89 per cent while 11 per cent demand of silk fabrics industry was mitigated by imports. By 2001-02 this import share in total raw silk availability in the country increased to 21.2 per cent. This rising trend in import dependence, in turn, affects large section of sericulture farmers and artisans and that spoils their process of income generation through sericulture. The cheap raw silk import not only reduced the domestic price of reeling cocoon and raw silk but it also offset the impact of factor productivities on income generation from sericulture. The year 2003-04 recorded highest import of raw silk in India when almost 40 per cent of domestic silk demand was met by imported raw silk (See Table-1).

Table 1. Import share in domestic consumption in post globalization decades (1990-2012)

Year	Domestic Raw Silk Production (MT)	Raw Silk Imports (MT)	Import Share in Domestic Consumption (%)
1990-91	12560	1598	11.29
1991-92	11763	2076	15.00
1992-93	14168	2768	16.31
1993-94	13691	4892	26.33
1994-95	14579	5403	27.04
1995-96	13909	4149	22.98
1996-97	14126	2911	17.09
1997-98	15236	2346	13.34
1998-99	15544	2827	15.39
1999-00	15214	5008	24.75
2000-01	15857	4713	21.96
2001-02	18395	4950	21.20
2002-03	14617	9054	38.25
2003-04	13970	9258	39.86
2004-05	14620	7948	35.22
2005-06	15445	8383	35.18
2006-07	16525	5565	25.19
2007-08	16245	7922	32.78
2008-09	15610	8392	34.96
2009-10	16322	7338	31.01
2010-11	16360	5820	26.24
2011-12	18272	5683	23.72
2012-13	18755	4951	20.89

Source: Central Silk Board, Bangalore & DGCIS, Kolkata

The raw silk (whether domestically produced or imported) is transformed to soft-silk by dyeing and printing on it and ultimately the silk-fabric is being sold as a final product to the consumers in the market. Again, raw-silk is placed in higher assembly-line than reeling cocoon in the vertical spectrum of the industry. Therefore, it can be assumed that the value of raw silk is inclusive of the value of reeling cocoon.

Table 2. Trends of income generation in Indian sericulture sector (1983-2011)

Year	Income Generated from Reeling Cocoon (at current prices) (Rs. in Million)	Income Generated from Raw Silk (at current prices) (Rs. in Million)
Pre-Globalisation Phase		
1983-84	2370.64	30221.0
1984-85	2798.08	31971.6
1985-86	3191.43	37437.9
1986-87	3360.81	41602.2
1987-88	4183.63	50791.9
1988-89	6222.38	69266.2
1989-90	7965.53	83376.9
1990-91	7600.59	95197.0
Post-Globalisation Phase		
1991-92	11931.49	136512.9
1992-93	11634.04	122422.6
1993-94	10085.05	102257.7
1994-95	11390.60	121760.7
1995-96	11161.44	125671.0
1996-97	11652.24	134853.7
1997-98	12925.44	140882.0
1998-99	15134.64	142512.2
1999-00	13481.73	126399.0
2000-01	15693.83	139123.9
2001-02	16732.98	148132.6
2002-03	13715.37	103185.7
2003-04	10807.33	115591.5
2004-05	13683.08	109824.7
2005-06	17045.24	132826.6
2006-07	17474.60	143860.6
2007-08	15712.52	135471.0
2008-09	16853.13	160416.8
2009-10	22514.03	208024.4
2010-11	30456.36	277767.3
2011-12	26155.87	2640764.0
2012-13	37059.88	3185724.0

Source: Central Silk Board 1999, 2003 (www.texamin.nic.in)

The comprehensive trends of income generation both from raw silk and silk cocoon covering pre and post liberalization periods are furnished in Table-2. Value of reeling cocoon production which reflects the income of mulberry growers and silkworm rearers has maintained a more or less steady but horizontal trend without much fluctuation compared to that of raw silk. Value of raw silk basically accrued to silk reelers. From 1983-84 to 2010-11, a positive income trend has been observed in raw-silk production centre. A quantum jump of income from raw-silk

Table 3. Production trends of reeling cocoon in Pre & Post-Globalisation phase

Year	Mulberry Area	Reeling Cocoon	Raw Silk
	Ha	MT	MT
Pre-Globalisation Phase			
1971-72	104885	31864	2046
1972-73	107413	36111	2215
1973-74	110160	38214	2421
1974-75	120799	35852	2434
1975-76	124913	36739	2541
1976-77	125046	37963	2686
1977-78	131094	46517	3186
1978-79	140633	48988	3752
1979-80	155161	55890	4193
1980-81	170000	58208	4593
1981-82	179949	55210	4801
1982-83	196848	66811	5214
1983-84	206913	71276	5681
1984-85	214838	74875	6895
1985-86	217839	76717	7029
1986-87	229758	81573	7905
1987-88	241603	86528	8455
1988-89	268063	96471	9683
1989-90	294241	110433	10805
1990-91	316610	116663	11486
Post-Globalisation Phase			
1991-92	331237	107153	10658
1992-93	342764	129685	13000
1993-94	319215	117268	12550
1994-95	283093	123115	13450
1995-96	286496	116362	12884
1996-97	280651	115655	12954
1997-98	282244	127495	14048
1998-99	270069	126565	14260
1999-00	227151	124531	13944
2000-01	215921	124663	14432
2001-02	232076	139616	15842
2002-03	194463	128181	14617
2003-04	185120	117471	13970
2004-05	171959	120027	14620
2005-06	179065	126261	15445
2006-07	191893	135462	16525
2007-08	184298	132038	16245
2008-09	177943	124838	15610
2009-10	183773	131661	16322
2010-11	170314	130714	16360
2011-12	181089	139871	18272
2012-13	192126	142538	18755

Source: CSB (1999, 2003, Online: www.texamin.nic.in

sales has been observed from 1999 onwards. However, to study this growth trend more minutely, if we focus on the production growth pattern of reeling cocoon in pre liberalized period (1971-1990), we observe an annual growth of 7.06 per cent of reeling cocoon while the post-globalisation phase only experiences 1.05 per cent of annual growth rate in production of the same. Now our point of

analysis is whether this declining trend in growth in production is due to globalization or the productivity related issues is also hidden with that. Growth in raw silk production in post globalization phase (1991-2012) indicates increasing dependence on imports, especially on China. However, the growth rates in land productivity and labour productivity between 1995 and 2010 are 5.19 per cent and ï 0.82 per cent annually. The land productivity reflects effective technological efficiency (like high yielding mulberry seeds, fertilizers), but that fails to raise the production to the target level, as set by the Central Silk Board in every year. Negative labour productivity implies accumulation of greater numbers of labour force in the sericulture sector. Therefore, higher employment is not always indicative of greater prosperity. Higher amount of labour force with little amount of production of raw silk would actually result in further immiserization. Poverty is the definite outcome of this negative productivity-led growth. This lowering of growth rate coupled with negative labour productivity unambiguously signifies destitution of the reelers in the country. Sericulture farmers and reelers in the country have often been observed to launch nationwide protest against duty-free import of raw silk from China. The sericulture farmers always express their fear that liberal imports would always result in crash in prices of the cocoon as well as raw silk in the domestic market and hence their income generation would be stunted.

Table 3 reveals the contrasting production trend of reeling cocoon in the pre and post globalization periods. The sericulture peasants in the country have faced this crisis in growth of production on one hand and on the other hand globalisation has produced more marginal labours which declined the average productivity and intensified the poverty in the sector.

On the other hand, income generation through sales of raw silk has maintained a positive rising trend with 18.1 per cent of annual growth rate in income in the pre-liberalization period (i.e., during 1983-1990), while slightly fluctuating income generation path is observed during 1990-2005 (See Table 2). Fluctuation in income generation path could not be attributed to ups and downs in production trend during this period, but it may be due to fluctuating time-path of the price of raw silk during the same period (See Table 4).

Table 4. Compound annual growth rate in production and prices of raw silk during Pre & Post Globalization periods (%)

Growth Rate	Pre-Globalisation Period (1983-1990)	Post- Globalisation Period (1991-2010)
Raw silk production	10.58	2.28
Raw silk prices	9.8	2.7
Income generation through raw silk sales	18.1	5.1

Source: Authorsô calculation

Income generation in sericulture has taken a positive trend from 2005 onwards. The year 2005 is benchmarked as abolition year of Multi Fiber Agreement (i.e., the quota constraint faced by the developing economies to export their textile and readymade garments to developed nations). The post globalization phase as a whole experiences an annual growth of 5.1 per cent in income generation from raw silk which is substantially lower than that of pre-liberalisation era. This signifies how the globalization has hit the production cum income generation of the cocoon and reeling sector.

Now, if we concentrate on the trends of raw silk production between pre and post globalization period we can experience the similar declining growth pattern. It exhibits a growth rate of around 10.58 per cent in the pre liberalization period and 2.28 per cent in post liberalization period.

The price of raw silk also exhibits the similar diminishing trends. In post globalised phase, the price is being governed by competitive international prices which pulls down the rising tends of

domestic prices of raw silk. This justifies why the rate of growth of raw silk prices in post globalization phase is lower (2.7 per cent) than the previous phase (9.8 per cent). However, the rising trend in the price of raw silk is observed from 2005 onwards, which is benchmarked for abolition of MFA. Abolition of MFA actually increased the market of the developing economies in developed market, which shifts Chinese focus from Indian market to other developed markets. India remained significant importer of raw silk in the world during the phase of post globalization sharing 17.06 per cent of global import in 1995 and 28.5 per cent during 1999. And in 1999, around 44.85 per cent of Chinese Raw Silk Export was destined to India (EXIM Bank of India, 2002). This enormous volume of silk was exported at a much lower rate (US $ 19.65/tones) than it was exported to the developed destination like Italy (US $ 21.15) and Japan (US $ 21.66). All these keep a downward pull in prices of raw silk during the phase of post-globalisation. We have experienced rallies against these Chinese dumping at several times in these post globalization phase. Before 1998, Chinese yarn was restricted to the exporters against their entitlement related to their actual exports. Permission of silk yarn by Indian Government from October 1998 onwards led to a 30 per cent fall in domestic prices of reeling cocoons and silk yarn (Tikku, 1999).

This rate of fall in current prices during 2000 and 2003 (when inflation rate in India was also moderately hovered below 4 per cent) has aggravated to 40 per cent when imported price of Chinese raw silk fell from US $ 24.5/kg to US $ 13.5/kg. This disrupted the domestic prices of raw silk and reeling cocoon. The farmers and reelers were most affected segments due to increase in volume of cheap imported silk. Dumping of Chinese silk was established and the Government of India imposed anti-dumping duty for the international silk grade 2A or below in the year 2003 and that was effective for the period of five years. China cleverly handled this issue and started exporting twisted yarn and silk of Grade above 2A (Ministry Textiles, 2005). The silk rearers and reelers were worst affected by the rise in imports of raw silk with undercut prices.

A sunset review has been taken up for continuation of anti-dumping duty on import of raw-silk in 2008. Accordingly anti dumping has further been continued with an enhanced reference price of US $ 37.32/kg and this has been effective up to Jan 2014. All this measures boosted the artisanal industry of India as it shows a reviving period of growth during 2001-2010.

Table 5: Trends of raw-silk import from China

Years	Value of Import (Mn US$)	Value of Import (Rs in Cr.)	Volume of Import (MT)	Share of Chinese Raw Silk in Total Import
2006-07	143.63	649.90	5318	95.6
2007-08	180.64	727.38	7839	98.9
2008-09	194.78	895.78	8316	99.0
2009-10	192.43	913.07	7097	96.7
2010-11	199.27	907.86	5519	95.2
2011-12	213.85	1024.79	5159	90.9

Source: Central Silk Board (Indian Silk, Annual Reports 09-10, 10-11, 11-12)

With the abolition of MFA, China has also found expanded developed market to export their silk and silk product which ultimately boils down to lowering the growth rate of Chinese raw silk import in India. Rise in price level has saved large section of poor peasants and artisans whose sole livelihood rests on income generation through selling of reeling cocoons and raw silk.

The production trends in raw silk may depend upon host of factors like area of mulberry cultivation, amount of reeling cocoon production, price of reeling cocoon as well as amount of raw silk imports during 1980-2010. Analysing the available time series data set on mulberry area, amount of reeling cocoon production and others we have deduced the association of those parameters with income generation through raw silk (See Table 6).

Table 6. Degree of association of income generation of raw silk with other factors

Factors associated with income generation from raw silk	Correlation Coefficient	
	Spearman R	Kendall R
Price of reeling cocoon	0.92**	0.813**
Import of raw silk	0.579**	0.397**
Mulberry area	-0.217	-0.148
Reeling cocoon produced	0.805**	0.661**
Number of persons employed	0.512*	0.412*
Labour productivity	0.754**	0.640**
Price of raw silk	0.95**	0.847**

* significant at 0.05 level, ** significant at 0.01 level

Except mulberry cultivated area, all other factors ï price of reeling cocoon, import volume of raw silk, quantity of reeling cocoon production and number of persons employed through sericulture ï bear a significant positive correlation with income generated by raw silk. Indian silk industry has excess demand for raw silk. The volume of production falls short of volume of demand or consumption. Therefore, import volume is expected to raise the level of income generation in artisanal silk. On the other hand, due to increase in level of land productivity (through using high yielding variety mulberry seeds, better technology and improved silk hybrid) the income generation and land area may possess negative correlation, though no statistical significant relation has been found.

V. Fluctuations in Income Generation by Artisanal Silk Industry in West Bengal in Post Globalisation Period

The trends of income generation from sericulture at national level in the post globalization period have helped us to determine the sensitive factors which have a strong association with the import quantity of raw silk and price and output of produced reeling silk in different parts country. This section will specifically deal with the income generation trends in artisanal silk sector of West Bengal. In West Bengal sericulture is historically clustered around few districts where backward and tribal people have practiced this livelihood over generations. The strange fact is that the entire gamut of sericulture which involves rearing, reeling, weaving and trading is not evenly allocated in each silk producing district. For instance, Malda is renowned for raw silk production and reeling, but beyond this artisanal work the district is not specialized in further value-added chain in production. Similarly, Murshidabad is famous for silk weaving rather than production and reeling. Malda, Murshidabad and Birbhum conjointly produce around 99 per cent of state raw silk and reeling cocoon (Directorate Sericulture- Government of West Bengal, 2011). Within this producers-trio, Malda is the dominant leader producer in mulberry raw silk and reeling cocoon. It produces around 74 per cent of the state raw silk. From 2001 to 2010 Malda witnessed a jump in mulberry raw silk production from 1035 MT to 1389 MT, while Murshidabad and Birbhum showed a lackluster performance (Table 7).

Table 7. Production of cocoon and raw silk in West Bengal (2001-02, 2010-11)

Silk producing districts in West Bengal	Reeling Cocoon (MT)		Raw Silk (MT)	
	2001-02	2010-11	2001-02	2010-11
Malda	71.58	72.44	73.56	73.72
Murshidabad	13.26	13.31	13.50	13.39
Birbhum	11.62	13.29	11.798	12.89
Total	96.46	99.04	98.86	99.99

Source: Ministry of Textiles (District of Sericulture), Govt. of West Bengal (2001-02, 10-11)

Malda district contributes 70 per cent share of the state production in raw silk and 7 per cent share in national production, according to 2002-03 statistics profile of West Bengal.

Sericulture is the main stay of local people dwelling over this Gangetic plain. The huge inflow of cheap and exotic high grade silk yarn from China, Korea and Japan flooded this regional market in 2003 which resulted in sharp decline in the price 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 (Saeed 2003, Lahiri 2003).

During the post globalisation period in West Bengal (2002-2010), the growth in sericulture villages and sericulture farmers has revealed a negative trend. Despite the so-called rise in the level of institutional efforts and increase in infrastructure facilities (except to the reeling sector), the acreage extension of mulberry area in the districts of West Bengal could not control the exodus of silk farmers and artisans from this vocation. Raw silk production has experienced a growth of 3.33 per cent, while mulberry area has shown a growth of 12.59 per cent. However, the land productivity in raw silk production of West Bengal has shown a negative growth rate of ï 8.2 per cent during this period, while labour productivity has shown a rise in growth rate of around 5.53 per cent. This would ensure that the rising trend of raw silk production has not been outweighed by over employment of labour force in this unorganized sector. Table 8 comprehensively explains the far reaching impact of globalisation and its impact on this regional indigenous technology based artisanal silk sector. The following section will attempt to find out the causes responsible for fluctuations in income generation.

Table 8. Status and annual growth of sericulture in West Bengal during 2002-2010

Parameter	2002-03	2010-11	CAGR (%)
Sericulture village	2329	2080	-1.45
No. of sericulture farmers/artisans	110000	92200	-2.18
Grainages	16	22	4.06
TSC (Technical Service Centre)	59	59	0
Cocoon market	12	12	0
Silk exchange	2	2	0
Reeling Unit			
Charka	4163	322	-27.38
Cottage Basin	3330	2987	-1.34
Multi-End Reeling Machine	18	0	-100
Weaving Unit			
Slik handloom	18621	19045	0.28
Silk powerloom	128	128	0
Weavers	122000	27260	-17.08
Co-Operative Society	127		-100
Mulberry area (Ha)	12569	32467	12.59
Mulberry raw silk production (MT)	1450	1885	3.33
Reeling cocoon production (MT)	15171	17525	1.82
Land productivity (MT/ha)	0.115	0.058	- 8.2
Labour productivity (MT / person)	0.013	0.020	5.53

Source: Directorate of Textile (Sericulture) (http://www.seriwbgov.org/pbrssm.aspx)

A case study in Malda

As it has been previously mentioned, multi-stage sampling has been done to choose nine sericulture rich villages from Kaliyachak-I & II blocks. 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 structured questions regarding their livelihood and income generation. On the basis of their response, data were primarily collected and then tabulated. The primary survey was designed on the basis of a priori 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 9.

Table 9. 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 have been transformed into lognaturals. Thus the dependent variable, i.e., ôannual income of sericulture familyô has been log transformed to ln(Income). The chosen log transformed explanatory 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 varieties cropped by the farmer-artisans and 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 ôgoodness of the fitô of the model. Adjusted R^2 indicates that 65 per cent of the variation in annual income generated by the sericulture family is explained by the assumed explanatory variables. The model is free from the 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 multi-collinearity. From the estimated coefficients one can interpret that one percent change in cost of raw materials (including implements) results in around 0.71 per cent increase in annual income, while similar level of increase in loan amount would increase approximately 0.04 per cent of annual income of the sericulture family. Again, if mandays are changed by 1 per cent the annual income will also change by 0.16 per cent. 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 ôloan takingô 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.

VI. Conclusion

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 ôincome generation curveô, the primary analysis in the most sericulture rich district of West Bengal exposes the fact that the number of man-days generated from different phases of silk-worm rearing activity actually influences 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 farmers cum artisans who are expected to bear higher production costs have greater income generating power from this artisanal silk sector compared to their poorer counterparts. 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 has 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.

Under the Directorate of Sericulture certain annual targets are adopted by the planners. However, problem lies in regional bias outlook, which made the sericulture popular and prospective in Karnataka only. Income from sericulture as a whole depends upon area of cultivation, price of reeling cocoon, price of raw silk, import quantity and export earnings. However, studying the variables in West Bengal we find that only the number of mandays, cost of machinery and amount of loans taken by the poor silk farmers can help to raise the level of income generation from sericulture. A more intensive approach in balanced development can help to remove this regional bias. An effective institutional effort is required so that poor sericulture farmers can receive sufficient credit benefit to sustain this rural industry. The extension work, be it at State Government Co-operative level or at Central Silk Board level, needs to be synchronized and has to be intensive and time-bound and as well as target oriented. Poor farmer-artisan, whose only means of production is his generation based expertise, should be supported with creating larger opportunities for purchasing and sales. Otherwise it would be difficult to protect this traditional artisanal industry from the far reaching impact of globalisation.

Acknowledgements: *The authors would like to thank the Editor and the anonymous referee of the journal for their useful comments on the earlier version of this paper.*

References

Ali, E., Saha, S., & Parveen, S. (2008). Present scenario of Mulberry cultivation in Malda. *Indian Silk*, *47(6),* 4-7.

Anantha Raman, K. V., Phaniraj, H. S., Amarnath, S., & Sarathchandra, B. (2007). *Training, feasibility of human resource development for sericulture in India: A review.* Paper presented at International Conference on Sericulture Challenges in 21st century, 18-27Sept, 2007, Vratza, Bulgaria.

Bagchi, S. N., Saha, A. K., Ghosh, A., Ghosh, S., Sengupta, D., Das, S. K., & Sarkar, A. (2008). Development of Sericulture in West Bengal through IVLP. *Indian Silk*, *47(2)*,12-15.

Banerjee, D. (1990). Silk production in West Bengal: A case of stunted commercialization, CSSSC, (Occasional Paper 124).

Banerjee, D. (1995). Market and non-market configurations in rural West Bengal. *Economic and Political Weekly*, *XXX(47),* M135-M142.

Benchamin, K. V., & Nagaraj, C. S. (1987). An appropriate sericulture technique. In M.S. Jolly (ed.), 5 CSR&TI: Mysore, 69-90.

Benchamin,.K. V., & Manjeet J. S. (1987). Employment and income generation in the rural areas through sericulture. *Indian Silk*, 25(6), 8ï 15.

Central Silk Board (2009-10). Ministry of Textiles Annual Report 2009-10. http://www.csb.gov.in/.

Central Silk Board (2010-11). Ministry of Textiles Annual Report 2010-11. http://www.csb.gov.in/.

Central Silk Board (2011-12). Ministry of Textiles Annual Report 2011-12. http://www.csb.gov.in/.

Central Silk Board (2012-13). Ministry of Textiles Annual Report 2012-13. http://www.csb.gov.in/.

Chelladundi, A. (1999). Employment generation in sericulture. *Khadi Gramodyog*, *38(1),* 20-22.

Compendium of Statistics (1999). Ministry of Textiles, Government of India.

CSB & DGCIS (2007). *Sericulture at a Glance*, Retrieved from www.texamin.nic.in

_____ (2013). *Sericulture at a Glance*, Retrieved from. www.texamin.nic.in

De Sarkar, D., Saha, S., & Bhattacharjya, D. (2013). Sericulture as a tool for economic development. In: Roy, D.C. (ed.) *Economy of North Bengal : A District Level Study*, 629-639.

Deputy Director Reeling, Malda (2005). Official Statistics, Directorate of Textiles, Sericulture, Government of West Bengal.

Deputy Director Reeling, Malda (2010). Official Statistics, Directorate of Textiles, Sericulture, Government of West Bengal.

DGCIS, Calcutta (2007). Latest sericultural statistics in India. Retrieved from http.www.inidansilk.kar.nic.in/ rti/CO/SericulturestatisticsInIndia.pdf

Dhane V. P., & Dhane A. V. (2004). Constraints faced by the farmers in mulberry cultivation and silk-worm rearing. *Indian Journal of Sericulture*, 43(2),155-159.

Directorate of Sericulture, Govt of W.B. 2013. Retrieved from http://www.seriwbgov.org/pbrssm.aspx

Eswarappa, K. (2000). *Development challenges due to sericulture: A study in Chitoor district*, (unpublished M Phil Dissertation), University of Hyderabad.

Eswarappa, K. (2009). Socio-cultural dimension of sericulture: A village study from Andhra Pradesh; In: Moni, M. & Misra, S. (eds.) *Rural India : Achieving Millennium Development Goals and grass roots development.* New Delhi: Concept Publishing Company, 298-313.

Exim Bank of India. (2002). *India silk industry: A sector study*, Occasional Paper No. 90, March 2002, 21.

Gangopadhyay, D. (2008). Silk industry in India: A review. *Indian Science & Technology,* New Delhi: NISTDS, CSIR.

Government of West Bengal (2010). *Official Statistics*, Retrieved from http: www.seriwbgov.org/ right_to_info.aspx.

Hanumappa, H. G., & Erappa, S. (1986). Economic issues in sericulture: Study of Karnataka. *Economic and Political Weekly*, *20(31),*1322-1324.

Hazare, T. N., & Jadav, A. D. (2008). Sericulture brings better income. *Indian Silk, 46(9).*

International Sericulture Congress. (2014). Retrieved from http://inserco.org/en/isc-congress

ITC (2001). Silk Review. Retrieved from http://www.intracen.org/.

Kumaresan, P. (2002). Quality of silk production: Some economic issues. *Economic and Political Weekly, 37(39*),4019-4022.

Kumaresan, P., & Vijaya Prakash, N.B. (2001). Comparative economics of sericulture with competing crops in Erode district of Tamil Nadu. *Indian Journal of Sericulture*, *40(2),* 142-146.

Kumaresan, P., Geetha Devi, R. G., Rajadurai. S., Selvaraju, N. G., & Jayaram, H. (2008). Performance of large scale farming in sericulture: An economic analysis*. Indian Journal of Agricultural Economics, Vol. 63(4*).

Lahiri, D. (2003). Cheap silk yarn imports threatens Bengal farmers. *Business Line*, Feb 24.

Lakshman, S., Jayaram, H., Ganapathi Rao, R., Mallikarjuna, B., & Geetha Devi, R. G. (1998). Manpower utilisation in mulberry sericulture : An empirical analysis. *Manpower Journal*, Vol 33, 49-63.

Lakshmanan, S. (2007). Growth trends in mulberry silk production in India: An economic analysis. *Financing Agriculture*, July-August.

Lakshmanan, S. and Geetha Devi, R.G. (2007). Tamil Nadu: Employment opportunities in sericulture. *Indian Silk, 45(11).*

Mattigatti, R., Srinivasa, G., Iyenger, M. N. S., Dutta, R. K., & Geetha Devi, R. G. (2000). Price spread in silk industry: An economic analysis. *Indian Journal of Sericulture, 39(2),* 163-64.

Misra, R. (2010). Impact of globalisation on rural employment (1983-2008). *Indian Economic Journal*, 58 (3).

Radhakrishna, P. G., Shekharappa, B. M. & Manibashetty, V. G. (2000). Silk and milk: An economic package for rural upliftment. *Indian Silk, 38 (9)*.

Roy, C., Roy Mukherjee, S., & Ghosh, S. (2012). Sericulture as an employment generating household industry in West Bengal: A study on its current trends and prospects. *Artha Beekshan, 21(3),*131-155.

Roy, D.C. (2013). *Economy of North Bengal: A District level study.* Siliguri: N.L. Publishers.

Roy, C., & Roy Mukherjee, S. (2015). An analytical study on determinants of income generation in rural sericulture sector of West Bengal. *Indian Journal of Economics and Development, 3(2),* 168-180.

Saeed, M . (2003). Technical barriers to trade: Cheap silk yarn imports threatens Bengal Farmers. *The World Trade Review*, 3(6).

Sericulture & Statistics (2003). Central Silk Board, Ministry of Textiles, Govt. of India.

Sinha, S. (1989). Development impact of silk production: A wealth of opportunities. *Economic and Political Weekly*, XXIV(3),157-163.

Statistical Biennial(1986). Ministry of Textiles, Government of India.

Thangavelu, K. (1989). Lacunae in Indian Sericulture. *Indian Silk,* 27(8).

Tikku, M. K. (1999). Tangled threads: Silk growers and imports, *Economic and Political Weekly*, XXIV(10-11), 579.

Usha Rani, J. (2007). Employment generation to women in drought prone areas: A study with reference to the development of sericulture in Anantapur district of Andhra Pradesh. *Journal of Social Science,* 14(3), 249-255.