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Article

Issues of productivity, employment and exploitation in artisanal silk industry of West Bengal

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Abstract: Sericulture is an important livelihood option in rural West Bengal providing employment to more than 1 lakh families in the rural and semi-urban areas. The productivity level of sericulture (land and leaf) is not low compared to that of the major silk producing states in the country, which opens further scope to research and analyse its productivity. This paper has explored several dimensions of its growth pattern during the planning periods of West Bengal. A field level survey in the major silk producing district of West Bengal has exposed few factors like household size and male hired labourers which are positively raising the level of average employment in the sericulture farms, while education level acts as a significant reducing factor, along with mandays involved with the activities. It implies sericulture is still only a popular livelihood activity among the backward people. On the other hand, small holding capacity of the rural farmers and poor economic condition of the artisans have been identified as major impediments in the path of development of sericulture in West Bengal. The rural moneylenders/ traders (*dadani mahajan*) utilizes this advantage and extracts a major part of the pay-off intruding into the supply chain of the industry. In the textile policy, the objective of the government always centres on the issues like extension of sericulture through acreage and production, ignoring the issues like 'economic-exploitation' faced by the artisanal classes at each level of value addition in the supply chain. In the absence of institutional apathy and well-linked credit system in the remote rural areas coupled with financial illiteracy of the rural artisans, the objective of development of artisanal silk industry in West Bengal seems to be far away.

Key words: West Bengal, sericulture, productivity, economic condition

Sericulture is one of the most promising agro-based cottage industries of West Bengal, providing annual employment and livelihood to more than 1 lakh families predominantly dwelling in the rural and semi-urban areas (GoWB-DoS, online). The productivity level of sericulture (land and leaf) is also not low compared to that of the major silk producing states in the country (Roy et al., 2012). Despite these successes, it failed to develop evenly across all the districts of the state starting from its historical origin. Malda, Murshidabad and Birbhum were the three districts where prosperity of this sector had been prominently visible since eighteenth century. Even in 2001-02, the shares of mulberry raw silk production of these three districts remained 71.5%, 13.3% and 11.6% respectively (CSB, 2003). Flourishing of mulberry sericulture in these districts hinged upon the nature of soil, climatic conditions and presence of sericulture farmers and artisans in those regions. Malda had a long association with silk production since 19th century and production of raw silk was one of the major auxiliary activities of this region. Presently, Malda produces 6% of the national production and thereby occupying a pivotal role in production of mulberry raw silk in West Bengal. Murshidabad is famous for silk weaving as it bears a 350 years old indigenous silk industry's inheritance (Chaudhuri, 1977). On the other hand, Birbhum was originally a manufacturer of silk piece goods. In the 17th and early 18th centuries, the silk-articles, produced in Birbhum, had a good market outside Bengal. They were patronized by the Moughal Court (Gupta, 1980). The exports of Bengal silk manufacturers to England increased rapidly after the assumption of Dewani in 1765 (Mukhopadhyay, 1995) and Kassimbazar became the principal hub of this silk trading (Mukherjee, 1994). This is the historical legacy carried by these silk producing triplets.

The major objective of this paper is to delineate several issues related with productivity and employment creation of this artisanal silk industry during the periods of planning especially in the post globalisation era, when stiff competition with smuggled/ imported Chinese silk is trying to erode the prospect of the industry in rural and semi-urban area. The employment perspective of this household industry needs to be categorically studied and investigated at the backdrop of its growth trajectory, so that decaying of this sector can be contained with policy restructuring program. The paper will briefly analyse the tardy progress of this agro-based industry in West Bengal during various years of planning periods, and will make a district level in-depth analysis. We will try to demark several issues attached with the supply chain of the industry in West Bengal, and will make a case study on the employment issues of the sericulture

industry of West Bengal. The conclusion section contains discussion on making some significant way ahead.

Progress of sericulture in West Bengal during planning periods

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

From the Second Five Year Plan (1956-57 to 1960-61) onwards, sericulture received a new emphasis in India as separate allocation of fund under Central and State sericulture department was approved by the Planning Commission. Since then several development programs were taken up. Against allocation of Rs 62 lakh for the state, only 37 percent was utilized in this plan period. Incidentally, West Bengal had been producing all four commercially exploited varieties of silk since the inception of the planning period. Out of the four varieties mulberry, eri, tasar and muga, the first two silkworm breeds are domestically reared, while tasar and muga are wild and reared on trees. Each of these silkworm species feeds on leaves of specific food plants. Of these four varieties, mulberry silk yields maximum share and generates maximum level of employment. Mulberry sericulture is also practiced throughout the state of West Bengal excepting Howrah and East Medinipur district.

During the Third Plan (1961-66), Rs. 79 lakh was allocated for West Bengal and only 40 percent was utilized. Central Sericulture Research Institute at Berhampore was reorganized during this period. This is the oldest premier research institute in West Bengal established in 1943 mainly to restore the decaying trends of sericulture due to outbreak of silkworm diseases. Gradually,

the Institute modified its objectives. However, developing technologies to improve mulberry leaf productivity in more eco-friendly and cost efficient way remained its major objectives. Central Silk Board always works in close tandem with this Research Institute along with National Silkworm Seed Organization to implement an array of developmental project encompassing sericulture. Another major objective of the Research Institute was to evolve region and season specific high yielding silkworm breeds. Updated technological knowledge is being disseminated by the institute's extension network program. It has been observed that the excessively diversified climate remained a serious bottleneck for sustainable development of sericulture in West Bengal.

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

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

Again during the Seventh Five Year Plan (1985-1990), the growth in mulberry cultivation and raw silk exhibited a diminishing trend, while 71 per cent of the allocated fund was spent. During this plan period, the Central Silk Board implemented an Intensive Sericulture Development Project in West Bengal at a

total outlay of Rs. 967 lakh. The project envisaged expansion of area under mulberry cultivation by 4000 acres besides developing infrastructure for encouraging the systematic seed production, and, supply and marketing cocoons. During the terminal year of the Seventh Plan, National Sericulture Project was introduced in West Bengal by Central Silk Board with financial assistance of the World Bank and SDC. The project was launched over a period of seven years for the development of mulberry sericulture in the state with a credit line from IDA and SDC.

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

Table 1 comprehensively reveals the progress of the sericulture sector of West Bengal during the planning periods. The production of raw silk has shown a moderate annual growth of 2.69% though the land and labour productivity have shown a declining trend during the planning periods (See Table 2). However, the Eleventh Plan period has shown a bright picture for land productivity.

During the first decade of the new millennium (2001-2010) sericulture sector in West Bengal experienced certain distinguished modification. The first year of the Tenth Plan (i.e., 2002-2003) witnessed an increase in production of mulberry raw silk by 3.1% (1450MT) compared to its performance of the previous year 2001-2002 (1407MT). However, there was a sharp decline in the areas of mulberry cultivation during that period. In 2001-02 the area of mulberry cultivation was 18794ha. It was reduced to 12569ha in 2002-03 which in other way also indicated its rise in productivity. In 2002, approximately 1.1 lakh sericulture families were involved with production of raw silk.

Table 1. Progress of sericulture during planning period in West Bengal.

End of plan period	Allocation (Rs. in Lakh)	Expenditure (Rs. in Lakh)	Mulberry cultivation area (ha) (cumulative)	Raw silk production (MT)	Employment generation (lakh person) (cumulative)
First Plan	7.21	2.37	4912	382	1.14
Second Plan	62.0	23.26	6070	543	1.43
Third Plan	79.0	31.86	6490	685	1.48
Fourth Plan	64.0	52.0	5733	563	1.40
Fifth Plan	375.0	481.1	8093	450	1.60
Sixth Plan	1433.25	710.0	12401	717	2.45
Seventh Plan	1587.26	1127.08	16337	926	3.23
Eighth Plan	5195.0	3168.74	21575	1158	4.27
Ninth Plan	1284.06	1391.41	21817	1118	4.31
Tenth Plan	NA	NA	19013	1407	NA
Eleventh Plan	NA	NA	13138	1885	NA

Source: Market Research Wing, Textile Committee, Mumbai

Table 2. Trends of land and labour productivities in artisanal silk industry of West Bengal.

	Land productivity (MT/ ha)	Labour productivity kg/ per person
First Plan	7.776	3.351
Second Plan	8.946	3.797
Third Plan	10.555	4.6283
Fourth Plan	9.820	4.021
Fifth Plan	5.560	2.812
Sixth Plan	5.782	2.9265
Seventh Plan	5.668	2.867
Eighth Plan	5.367	2.712
Ninth Plan	5.124	2.594
Tenth Plan	7.400	NA
Eleventh Plan	14.348	NA

Source: Authors' calculation from the data received from CSB (1999, 2003, online)

By the end of the Eleventh Five Year Plan (precisely in 2011) the involvement of sericulture families has shown certain degrees of contraction, i.e., 0.92 lakh. This large number of exodus of sericulture artisans from sericulture drives the research discussion to delve into some intricate analysis about the issues of employment generation in this sector. This no doubt indicates that sericulture fails to provide expected stable returns to the farmers compared to alternative cultivable food grains or other cash crops. However, raw silk production has shown a substantial degree of improvement from 1407 MT to 1885MT during this 2002-2011. Despite the fall in acreage and number of involvement of

sericulture families, this augmentation actually reveals technological induction and its implementation in rural sericulture.

Table 3. Status of sericulture in West Bengal.

Parameters	As on 31.3.2002	As on 31.3.2011
Plantation (acres)	46983	32467
No. of farmers	110000	92200
Silk production	1407	1885
A. Infrastructure provided by the Government		
Farms	62	62
Grainages	16	16
Cold storage	4	4
Technical service centre	59	59
Cocoon market	12	12
Filature	2	2
Twisting plant	2	2
Reeling training centre	5	5
Sericulture training institute	2	2
B. Infrastructure at private level		
1. Reeling unit		
a) Cottage basin	4158	2987
b) Ghosh basin	NA	4755
c) Charka	3193	322
2. Drying chamber		
3. Powerloom	138	128
4. Handloom	28621	19045
5. Weavers	122000	27260

Source: Govt. of West Bengal, Ministry of Textile (sericulture) (online)

Table 4. District wise status of mulberry silk in West Bengal (as on 31 March 2011).

Districts of West Bengal	Plantation area (acres)	Production of mulberry raw silk		Production of silk waste (MT)	Additional employment generation (no.)
		(MT)	(%)		
Malda	366.68	1389.36	74	449.18	3093
Murshidabad	270.69	252.54	13	95.90	2166
Birbhum	263.47	242.90	13	93.0	2108
Bankura	26.00	0.01	-	0	128

Source: Directorate of Sericulture, Govt. of West Bengal (2011)

Table 5. Production and value of sericulture product of West Bengal.

Mulberry reeling cocoon	Production (MT)			Average price/ Kg			Value (Rs. in Lakh)		
	'09-10	'10-11	'11-12	'09-10	'10-11	'11-12	'09-10	'10-11	'11-12
Multivoltine	1329	147	60.9	100	123	125	1329	181	76
Cross-breed	15939	17352	17782	150	165	170	23908	28631	30229
Bivoltine	3.4	25.8	31.8	160	180	180	25242	28858	30364

Source: Directorate of Sericulture, Government of West Bengal

Table 6. Status of mulberry raw-silk in West Bengal.

	As on 31/3/2011	As on 31/3/2012	As on 31/3/2013
Mulberry area (ha)	13116.7	13685.1	14231.7
Raw silk production (MT)	1885	1923.78	2018
Land productivity (Kg/ha)	143.7	140.6	141.8
Employment generation	259736	270992	281816
Labour productivity (Kg/ labour)	7.26	7.09	7.16

Source: Directorate of Textile (Sericulture), Government of West Bengal

Table 7. Caste based classification of mulberry sericulture farmers cum rearers in West Bengal during 2011-12.

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

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

Table 8. District-wise number of artisans in mulberry silk industry of West Bengal (2011-2012).

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

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

So far as infrastructural amenities are concerned, artisanal silk industry in West Bengal remained static during 2002-2011 (see Table 3). At present, there are 62 basic seed farms, 16 egg production centers, (grainages), and 59 technical service centers throughout the state. Starting from the number of farms, grainages, cold storage, technical service centre, to filature, twisting plant, reeling training centre and sericulture training institute no dynamism has been observed in institutional infrastructure level during 2002-2011. At private infrastructure level, the result is even more depressing. Numbers of reeling units have declined both in cottage basin and country charka units. Powerlooms have been reduced from 138 unit to 128 unit and so did the number of handlooms during 2002-2011. Despite this worsening level of infrastructure, number of weavers connected with silk production has been raised from 1.2 lakh to 2.7 lakh during this phase (Department of Sericulture, Government of West Bengal, 2002, 2011). Directorate of Textile (sericulture) in their online information indicated that during 2011 to 2013, the mulberry area increased from 32467 acres to 35227 acres and the corresponding raw-silk production was also stimulated from 1885 to 2018 Metric Tons (MT). The employment generation during this phase increased from 259736 to 281816. According to BAE&S (online), raw silk production was raised from 1790 MT to 2689 MT during 2010-2011, while employment generation was raised from 247480 to 264942 persons. Despite some data discrepancies due to different sources of origin, both the statistics actually reveal a growing trend of artisanal silk industry in West Bengal over the recent past. The next section will make an in-depth analysis on productivity and employment issues at district level.

District level analysis of artisanal silk sector in West Bengal

Malda, Murshidabad and Birbhum are the only three traditional silk producing districts where production of raw silk is not only substantial but also bears a historical legacy since the colonial periods. Even in 2010-11, Malda produces 1389.56 MT of raw silk (which is 73.7% of state's production). From 2001-02 to 2010-11, this production showed a compound annual growth rate of 0.03 percent. Area of mulberry cultivation has increased from 335.27 acres to 366.68 acres, showing a growth rate of a meager 0.01 percent. However the additional employment generation capacity was reduced from 4065 persons to 3093 persons over this period of nine years. This again indicates that the employment generation issues needs to be investigated.

Murshidabad is the second highest raw silk producing district in West Bengal producing around 15 percent of the state's production. Murshidabad is rather famous for silk woven sarees (namely Murshidabad silk). So far as the three parameters, i.e., mulberry area coverage, production of raw silk and employment

generation are concerned, the performance of the district is not equivalent to that of Malda district. From 2001-02 to 2009-10, the mulberry area had declined from 280.62 acre to 270.69 acre, while production of mulberry raw silk has shown a matching declining trend from 190 MT to 95 MT. Even in the case of additional employment generation it shows a diminishing trend from 3513 persons to 2166 persons during this phase. Therefore progress of sericulture sector in Murshidabad district shows a retrogressive trend during 2001-2010 (DoS, GoWB, online).

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

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

However, anti-dumping regulation in 2003 was able to control few portions of mulberry uprooting in Malda and Murshidabad and tried to control dwindling of this heritage industry. The sericulture dominated districts of West Bengal handled the fierce competition emerging out from globalisation with the effective institutional support, like, anti-dumping regulations. On the other hand, as West Bengal produces bivoltine silk in very meager proportions, that seems to restrict

the foreign exchange earning capacity of the state to a great extent. Bivoltine silk has a quality edge over multivoltine silk with superior denier quality. However, despite these shortcomings, around 30 percent of its mulberry silk was exported during the early 1990s (Banerjee, 1995) and in 2011-12 West Bengal exported 179.96 lakh square meters of silk to foreign countries and earned as high as Rs. 61 crores of rupees. The Regional Office of Kolkata issued a host of certificates to accredit the quality efficiency of the exported silk. These certificates are Generalized System of Preference Certificate, Handloom Certificate, Handicraft Certificate, Certificate of Origin, Special Certificate of Origin of Australia, Switzerland etc.

In West Bengal, three varieties of reeling cocoons are bred, which includes multivoltine, crossvoltine and bivoltine. Table 5 helps in analysing the value generation from reeling cocoon during 2009-2012. The income generation from bivoltine reeling cocoon produced in West Bengal was Rs. 25242 lakh in 2009-2010, which rose to Rs. 28858 lakh in 2010-11 and Rs. 30364 lakh in 2011-12. The share of crossbreed mulberry cocoons occupies dominant position in the production of reeling cocoon. Malda and Murshidabad were the two dominant districts where the share of Cross-Breed reeling cocoons production remained at 98.84% and 98.58% in 2010-11 (DoS Govt of WB, 2010-11). Bivoltine breeds are also cultivated but in restricted amount only in these two districts and these are the reasons which impede the state's potential to excel in foreign markets.

Table 6 portrays the recent growth trajectory faced by the artisanal silk industry in West Bengal. Mulberry area of the state has extended from 13117 ha to 14232 ha, while raw silk production has increased from 1885 MT to 2018 MT during this period. The employment generation has also shown an upward trend during this phase. The land productivity has shown a marginal fall in acreage productivity hovering within the range of 141 and 144 kg/ha. According to the reports of Directorate of Sericulture, Govt. of West Bengal, the critical gap due to this lackluster performance of acreage productivity is lack of region and season specific silkworm races suitable for West Bengal, extreme climatic conditions which is a predisposing factor for silkworm diseases, small land holding of farmers, lack of irrigation facilities and inadequate disease surveillance sector. The labour productivity also reflects a marginal increasing trend and hovers around 7.1 to 7.3 kg per labour. The labour involvement in several segments of the extensive supply chain of this industry can reveal several problems attached with every stages of this vertically integrated industry.

Predominance of marginal classes in the supply chains of artisanal silk industry

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

Almost all these activities are largely based on family labour. The districts in which the rearing and reeling activities are predominantly located have a high percentage of wage labour in the aggregate rural workforce (Banerjee, 1995). Malda has the largest percentage of mulberry silk rearers (61%) and reelers (50%) in the state (DoS-Govt of WB, 2011-12) while 15% of state silk rearers and 40 % of state silk reelers reside in Murshidabad. Rearing and reeling are largely dominated by backward people including Muslim minorities. The recent available statistics on West Bengal reveals that in 2011-12 the mulberry silk production involved 96490 sericultural families of which 16.6 per cent belonged to SC categories and 1% belonged to ST categories (See Table 7). The tribal involvement is as large as 69 % in *tasar* silk and 67% in *eri* silk during 2011-12. *Tasar* silk is largely cultivated in Bankura and Purulia, while *eri* silk is popular in Jalapaiguri and *muga* silk is famous in Cooch Behar. Mulberry silk is the largest producing silk in the world as well as in the country; West Bengal is also not an exception. Malda, Murshidabad and Birbhum are the states where mulberry silk producing activities at all levels are quite vibrant. Bankura is the only state where mulberry silk weaving has a strong base and it has a heritage of producing baluchari sari.

According to Banerjee (1990), the mulberry cultivators in West Bengal can be classified into three major groups – (1) the small cultivators who put all or major portions of their lands under mulberry cultivation and the rest under paddy cultivation; (2) middle cultivators who have sizeable lands under mulberry

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

The silk weaving materials can be categorized into three categories – HG (high grade silk material), MG (middle grade silk material) and LG (lower grade silk material). The high grade silk materials are usually produced in highly efficient Jacquard looms (throw shuttle type) while MG and LG materials are produced on the ordinary traditional wooden looms. The traditional ordinary loom is capable of producing only coarse design while jacquard looms are accomplished for its sophisticated design. The labour time requirement to operate the jacquard loom is much less than that of traditional looms. The weavers can continually work in a jacquard loom while traditional looms require certain time gap for functioning properly.

However, these machines are expensive which restricts its use among weavers in West Bengal (Banerjee, 1995). Besides, the costs of design making, transferring the designs on to the cards by the system of punching, the costs on loom setting with a huge volume of yarn make it prohibitive to common weavers. The common weavers of Bengal, whether residing in Murshidabad or Bankura thus prefer ordinary looms.

In silk weaving of West Bengal, there exist broadly two types of entrepreneurs - (i) those who under take weaving only, (ii) those who own reeling/spinning units and also assign subcontract work to domestic weavers. Thus the latter constitute vertical integration in artisanal silk industry. They form societies, while the former constitute either local private silk merchants or societies. Again societies can be of two types- (a) Cooperatives where the members are equity holders and net profit is distributed among the members according to their equity share; (b) the charitable societies which are formed by seven or more individuals. Banerjee (1995) found that most of these latter type of societies engaged in weaving and/or reeling, are floated with the members of family based household industries. These societies are certified by KVIC (Khadi Village Industries Commission) or KVIB (Khadi Village Industries Board). All the KVIC/KVIB

societies are supposed to create the backward linkage, i.e., with reeling/spinning unit under their own initiatives. Only in exceptional cases they are entitled to buy products from outside.

From the annual report of 2011-12 of Directorate of Sericulture, Government of West Bengal, it was found that presently 32 reeling cooperatives units are in operational stage. Majority of the silk weavers in West Bengal work on their own looms in their own houses using machineries obtained either from societies or private silk merchants. They receive piece-rate wages from putters-out and thus the agents who actually subcontract the work to individual weavers play a dominant role. The weaver, just by virtue of his ownership of the weaving tools is not an independent manufacturer. Even the independent and comparatively affluent weaver who owns a loom and work with own raw materials (i.e., yarn etc.) is largely subjected to the conditions of the output market. It is the silk merchants who provide marketing channels for most of the outputs by otherwise independent weavers. Thus the weaving artisanal classes are at the mercy of the dominant merchant class. The tragedy is that the poor artisan classes are left with no choice other than depending on money lenders for the working capital. This often results in contractual bondage of these artisanal classes to money lenders, which has proved to be unfavourable in terms of realization of returns for this artisanal silk industry in West Bengal.

Case study on employment issues of artisanal silk industry in West Bengal

In this section our primary object is to build an employment generation model in artisanal silk industry on the basis of primary survey data collected from sericulture rich villages in Malda district. For primary survey certain sericulture rich villages were chosen from Kaliachak Block in Malda district of West Bengal. Mulberry cultivation in Malda district is mostly localized in Kaliyachak-I and Kaliyachak-II blocks comprising 90% of the total mulberry cultivation area. Kaliyachak-I itself occupies 61% of the total cultivated area under mulberry in the district (see Ali et al., 2008). Twenty percent of total sericulture farmers of the district live in this block (Official Statistics, Deputy Director Malda, 2010). Stratified random sampling has been done to choose the sericulture rich villages namely, Gayes Bari, Sujapur, Mothabari, Marupur, Alipur, Sershahi, Feranchak, Joshkabil from this block. Twenty five to thirty households involved with sericulture activities (mainly rearing and reeling) have been chosen from each village using random sampling. Thus a total of 212 households constituted the sample size of this study. On the basis of their response, data was primarily collected and then tabulated.

This primary survey was designed on the basis of apriori hypotheses to determine the factors influencing the employment level of the sericulture households. The following factors have been primarily identified as influencing determinants of average employment in a domestic sericulture household-farm through out the year. The rationale for choosing these factors is also explained below.

Household size: It is an influencing factor for determination of level of employment in a particular domestic sericulture farm. Higher the household size, higher is the requirement of income generation as well as higher will be the capacity of potential employment.

Mulberry area: Mulberry leaf is food of sericulture worms and therefore higher mulberry area is indicating greater opportunity to raise sericulture and therefore employment level is expected to rise. However, in case of declining market price, there could be conversion of sericulture to other profitable cash crops or food crops which in turn would decrease the level of employment in sericulture farm.

Years of schooling by head of the family: Years of educational background may affect the level of employment of sericulture farms. An educated family head may not be willing to employ his offspring in domestic work-activity and not for education attainment, thus resulting in fall in employment levels.

Male hired workers: Hired male workers are important proponent of the level of employment in a sericulture farm. Male hired labour is more cost escalating and therefore rise in this cost signifies the intensity of the domestic farms in this sericulture business.

Female hired workers: As sericulture sector is often known as women labour intensive sector, investigation can be made to test whether numbers of hired female workers have any impact on the total number of employment created in sericulture sector. Female workers are interpreted in numbers and this is a continuous variable.

Man-days: It refers to the number of working-days created by a particular work. Higher number of man-days offered by a job also makes it more stable, assuring an average return throughout the year. Previous studies showed that sericulture activity offers higher man-days if rearing is practiced throughout the year. One can hypothesize that greater level of employment is associated with higher man-days created by the activity.

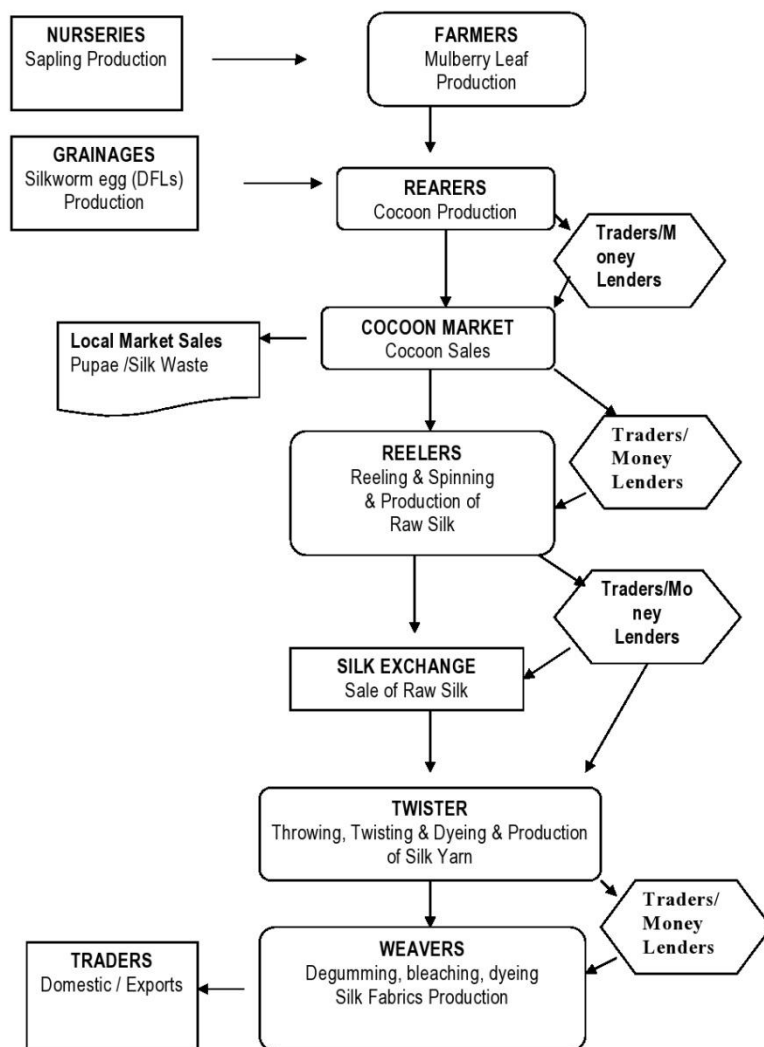


Figure 1. Supply chain in artisanal silk industry (mulberry) of West Bengal

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

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

Employment Generation Model

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

Ordinary Least Square method has been applied with SPSS package to regress 'Employment Level' on the said explanatory variables. ANOVA table shows us that "F" statistic of the model is significant which explains the goodness of fit of the model. The table also tells us that Adj.R² = 0.855, which means that 85.5 percent variations of the dependent variable is explained by the regressors. Observing the pattern of the plot of the 'predicted residuals' and the 'residuals', it has been inferred that no discrete pattern between them exists and that ensures non existence of heteroscedasticity. In the table 9(c), the values of VIF (which are all less than 5) ensure that multicollinearity problem does not exist in the model.

Table 9 (a). Model summary

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

Table 9 (b). ANOVA

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

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

b Dependent variable: Employment level in domestic sericulture farm

Table 9(c). Estimated coefficients

	Unstandardized coefficients		Standardized Coefficients		T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIF
(Constant)	3.610	.609			5.928	.000		
Household size	.339	.055	.179		6.138	.000	.811	1.233
Mulberry area	-5.892E-02	.037	-.043		-1.596	.112	.970	1.031
School education years of head of the family	-9.638E-02	.042	-.063		-2.316	.022	.926	1.079
Male hired labour	1.071	.056	.645		19.231	.000	.615	1.627
Female hired-labour	.849	.083	.325		10.180	.000	.680	1.471
Mandays generated	-7.232E-03	.003	-.085		-2.627	.009	.659	1.518
Cost of raw materials	1.772E-06	.000	.042		1.344	.180	.721	1.388

[Dependent Variable: Employment Level in Domestic Sericulture Farm]

Interpretation of the result

From the table of estimated coefficients (Table 9) the following results can be inferred as: If number of households is raised by 10, then the average employment level in a sericulture farm would be raised by 3. Years of schooling by the head of the family discourages the level of employment in a sericulture farm. If school education is raised by 10 years, then the level of employment would decline by one person per farm. Again, addition in male hired labour will raise the average number of employment by one unit throughout the year, while a rise in female hired labour does not increase the average level of employment in sericulture farm throughout the year in the same proportion. It has been observed that an increase of 10 female hired workers have the tendency to generate 7 numbers of average employment in a sericulture family. On the contrary, creation of greater man-days ultimately declines the level of average employment of a sericulture farm. If 100 more man-days are created there will be a decline in the level of employment by almost 1 unit (0.7 is rounded off to 1).

Barring the significant regressors, another determinant needs to be mentioned, i.e., mulberry area cultivated by a farm, which bears an inverse relationship with level of employment by a sericulture farm. However, no rational justification can explain its inverse relation with employment generation.

Way ahead

In the above sections an attempt has been made to elaborate the progress of the tradition bound silk cottage industry, which involves a large sections of marginal and backward people of our state. A state level comparative study has confirmed that land based productivity is not hindering the growth of mulberry sericulture in West Bengal while progress of the artisanal silk industry during the planning periods reveals loopholes down the timeline in several dimensions, which includes lack of region and season specific silkworm races, extreme climatic conditions, lack of irrigation facilities and inadequate disease surveillance sector.

Small holding capacity of the rural farmers and poor economic condition of the artisans have been identified as major impediments in the path of development of sericulture in West Bengal. The rural moneylenders/ traders (*dadani mahajan*) utilizes this advantage and extracts a major part of the pay-off intruding into the supply chain of the industry. It has been found that in Malda district approximately Rs. 10-12 crores are getting rolled as capital investment and source of this working capital lies with rural traders who ultimately claims unusual share from their value addition.

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

The Twelfth Five Year Plan (2012-2017) has especially focused on certain issues of sericulture as major goals or aspirations for the development of sericulture through rural reconstruction. Evolution of season and climate specific, disease resistant robust silkworm breeds has been given greater emphasis. The

technology feasibility study in consultation with Central Silk Board and JICA (Japanese International Co-operation Agency) is already under process. Establishment of a Silk Park at Malda is also about to take place in the near future. Another important endeavour has been to link sericulture with major agro-based program like RKVY (Rashtriya Krishi Vikas Yojana), MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act), which are expected to bring better funds to this sector.

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