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Roy, Chandan and Dey, Arindam

Kaliyaganj College, West Bengal, India, Kaliyaganj College, West
Bengal, India

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MURSHIDABAD SILK INDUSTRY IN WEST BENGAL: A STUDY OF ITS GLORIOUS PAST & PRESENT CRISIS

Dr. Chandan Roy (Corresponding Author)
Assistant Professor & Head, Department of Economics
Kaliyaganj College, West Bengal, India, Pin-733129
Tel No: +91-9932395130; Email Id: chandanroy70@gmail.com

&

Mr. Arindam Dey
Guest Lecturer, Department of Economics
Raiganj University, West Bengal, India, Pin-733134;
Email Id: arin.dey.1410@gmail.com

Abstract

Murshidabad is the second largest traditional silk producing district in West Bengal, which bears a golden legacy of producing superlative silk in India since seventeenth century. Kassimbazar was one of the major hubs of silk purchase for the British silk merchants. The industry went into great decline as the Industrial Revolution in West set in. In the post Independence period attempts were made to revive this home-based artisanal industry in India to expand employment and income opportunities in the rural economy. However, during 2002-2012, there was an exodus of more than 23 thousand silk farmers and 10 thousand silk weavers from the industry. This paper delves into issues related with income determinants of the household silk industry in Murshidabad. The primary data analysis exposes that 'language efficiency', 'number of family members', 'ownership of bicycle/motorbike and television', 'male labour force' and 'women autonomy' are positively influencing the income of the silk producing households, while the significant factors which inversely influences the level of annual income of the silk producing households are 'age of the household head', 'female workers', 'cost of production', 'male family members', 'morbidity of female' and 'expenditure autonomy of female in the family'. The government should adopt pro-active measures like subsidizing the cost of silk weavers, revamp the health insurance scheme of the silk manufacturing women and increase the language efficiency to enhance the silk manufacturers' income earning capacity. The government should also raise the level of sanitation facility of the silk reelers and weavers and communication goods like bicycle, television to be provided.

JEL Classification: I32, J21, O13, R20

Keywords: Silk industry, Sericulture, Murshidabad, Weavers, Household Income

1. Introduction

Murshidabad is the second largest silk producing district in West Bengal (which is the third largest silk producing state in India). Being situated on the left bank of the river Ganges, the district witnessed a golden legacy of innumerable historical events. The geographical periphery of the district is bound within 23°43'5''N and 24°50'N latitude and 87°49'E and 88°46'E longitude. Presently, the district covers an area of 5,341 km² (2,062 sq mi) with a population size of 7.104 million (according to 2011 census). Murshidabad is identified as one of the densely populated districts of the state with 1,344 habitats per km² and the ninth most populous district in India (out of 640). Berhampur town is the headquarters of the district. The demographic population growth rate of the district is 21.09% with 66.59% literacy rate and sex ratio of 958 (2011 census). The district has 5 sub-divisions, 26 development blocks and 26 towns. In shape the district resembles with an isosceles triangle with its apex pointing towards the North West. The district is surrounded by Malda district in the north, Jharkhand's Sahebganj District and Pakur District in the north-west, Birbhum in the west, Bardhaman in the south-west and Nadia district in the south. Padma, the main distributory channel of the river Ganga separates Murshidabad from Malda district of West Bengal and Rajshahi district of Bangladesh.

Murshidabad is named after Murshid Quli Khan, Dewan of Bengal in the eighteenth Century. The Murshidabad city, which lends its name to the district, was the seat of power of the Nawabs of Bangla. The city was reduced to half of its importance as the treasury and the administrative headquarters of Bengal was shifted to Calcutta. However, during seventeenth century, Murshidabad was a well-known hub for silk textiles. English agents had reported in 1621 that huge quantities of silk could be obtained from this region. Murshidabad kept on prospering till the second half of the seventeenth century and eventually became the Eastern Mughal Province, Subah Bangla. During 1660s Murshidabad became a 'pargana' (headquarter) and its officers had jurisdiction over the European Factories at Kassimbazar.

The position of Murshidabad on the bank of the Bhagirathi made the town a promising centre of silk trade. The soil of Murshidabad was conducive to the cultivation of mulberry plants. It was grayish or reddish, mixed with lime and oxide of iron and beds of nodular limestone. Sir Streysham Sham, the East India Company Agent, explained that great part of Kassimbazar was planted with mulberry trees, the leaves of which were gathered young to feed the silkworms (O'Malley, 1914). The soil of the place was also fertile which helped the silk farmers to grow mulberry every year. Murshidabad also had the advantage of having a commanding view on the boats laden with goods of Indian and foreign merchants playing between the south and north west of the regions of the province. The European traders carried on extensive investments through river borne trade and the silk hubs of Murshidabad brought the European companies and the Government of the countries closer to one another.

The problems which have been identified with this age-old artisanal industry during the last two decades in Murshidabad district is large numbers of exodus of silk manufacturers from this sector. This logically raises the doubts against consistent income and employment generation by this sector. If the silk manufacturers including weavers could derive stable income from this sector, they would have rather stick to this domestic household industry and expand their business. This boils down to our core research questions that the factors responsible for affecting income of the artisanal silk sector of Murshidabad district needs to be determined.

Therefore, the main objective of this paper is to find out the determinants for which the income level of the silk manufacturers in this region is being affected and thereby causing decline in the numbers of artisans attached with this sericulture sector. Women worker is another significant factor which is high in artisanal silk sector and therefore any region specific issues underlying with this sector needs to be identified. This paper will unfold the golden legacy of Murshidabad silk sector before delving into the analysis of current crisis of the silk manufacturers in Murshidabad district specifically. The data collected from few regions of the district has been further investigated and econometric model will be built up to test the proposed research hypothesis.

2. Historical Legacy attached with Murshidabad Silk

George C. M. Birdwood , the renowned art referee for the Indian Section of the South Kensington Museum in his book 'The Industrial Arts of India (1800)' said - "The City of Murshidabad is still famous all over the world for its gold brocades or Kincabs." This single statement reveals the significance of the silk manufacturing hub of Murshidabad on the then time, which was once principal centre famous of the silk- weaving. Muslin, Jamdani and Baluchari Butidar Sarees from Murshidabad can be found in the Art Galleries of the Indian Museum in Kolkata, too. These clothed used to be carried out to faraway places across the globe.

In the seventeenth century during Mughal period, the foreign merchants, whoever came to India got attracted with Bengal Silk. Eventually, the Mughals opened their "Arangs" or purchasing centres in different places of Bengal. At that time Bengal was a bona fide storehouse of silk and Murshidabad was undoubtedly the beating heart of this artisanal industry, with a large chunk of production of silk (in the tune of £ 2.5 million) in Kassimbazar (Guha, 2003).

In 1658, the East India Company opened a "Kuthi" at Cossimbazar and started purchasing silk fabrics. By that time the Dutch, the French and the Portugees had also opened their "Kuthis" at Kalikapur, Farashdanga and Saidabad respectively. In the beginning, they started their operations on a small scale. According to Bernier, the Dutch employed 700 or 800 persons in their factories at Kassimbazar, and the English and other merchants as many more (Mukhopadhyay, 1987; Roy, 2014). It soon began to develop with European

capital and organization. In 1670, a factor "well skilled in silk" was sent out from England to Kassimbazar, and in 1681, when the chief was Job Charnock, the future founder of Calcutta, out of £ 230,000 sent out by the East India Company as "Investment" to Bengal, £ 140,000 was assigned to Kassimbazar. From this time forward the company made unremitting efforts to foster sericulture and extend the trade in silk, until 1776 "Bengal silk drove out all competitors, except Italian and China silks, out of the English market" (Rahaman, 2009).

In 1757, Robert Clive found Murshidabad as prosperous as London. EEIC started the business with trading concessions and slowly they revealed their true colour especially after the Battle of Plassey (1757). The weavers of Bengal had no choice left but to bear the brunt of their success. They were paid far less than the market price and were forced to work in the Company's factories. They were fined, imprisoned and whipped if they failed to deliver the requisite order. The EEIC left no stone unturned to monopolise the business of Bengal silk by coercing the weavers to sell their products only to EEIC instead of Dutch and French companies. This inhuman pressure and torture in turn pushed many of these weavers to leave their own places as well as profession. Still the numbers of destitute and miserable artisans were not less in number. Gradually with the uprising of Manchester Silk, the company understood that fortune of Bengal silk was one of the major obstacles in their own business expansion. In 1769, they changed their policies and declared that the manufacture of silk fabrics would be discouraged in Bengal and that of raw silk encouraged (Mukherjee, 1994).

The focus then shifted to the poor silk-thread winders. EEIC observer William Bolt (1772) reported, "Winders of raw silk have been treated with such injustice that instances have been known of their cutting off their thumbs to prevent being forced to wind silk". A few years after 1658, the East India Company started exporting raw silk to England. Consequently the silk weavers of Bengal became jobless as the demand for raw silk leaped up in greater proportion than that of weaved fabrics. The Silk Industry of Bengal confronted with grim crisis. Eventually, the tradesman of East India Company began to incur losses in silk trade. At last in 1833, the East India Company decided to close down the Silk Trade resulting into total unemployment of the silk spinners too. The artisans and weavers involved with the Murshidabad Silk Industry faced a serious crisis and were pushed into nowhere during the last part of the nineteenth century. Hundreds of filatures and silk handlooms were shut down. The British mill made silk came and tried to occupy that position and the sufferings of the Bengal silk weavers raised to unbelievable level as the British merchants, being unfairly supreme, started controlling both inland and export trades. The monopolistic control over raw silk resulted in various oppressive measures and it was recorded that the reelers of raw silk had to cut off their own thumbs in order to escape compulsory reeling of raw silk for the foreigners (Mukhopadhyay, 1995).

By 1840, an East India Company observer expressed his disappointment with deep anguish, "The destruction of Murshidabad is too painful". This journey from prosperity into what is euphemistically called 'decline' makes for a horrifying tale, in which silk played a crucial role. Doshi (2016) in her recent report at *The Guardian* wrote "For centuries, the villages around Bakipur, in the district of Murshidabad, were famous for

making some of the finest silks in the world. The Nawabs who ruled Bengal and governed the fertile provinces of eastern India made Murshidabad their seat of power. They were patrons of the flourishing industry of high-quality silk, which was shipped around the globe. Silk weavers had a special place in society, and were even traded between India's royal families as gifts or dowries.”

When the British colonised India, the nobility fell from power, and demand for silk declined. Silk weavers were encouraged to switch to making cotton. In the past few decades, the Indian silk industry had suffered because of competition from China.

In the pre-independence period Indians were at the cross-roads to decide whether they would allow the dying silk industry to dwindle further or revamp them? However, despite so many torture and unfair trade policies, the artisanal silk industry of Bengal had escaped from total annihilation. The freedom fighters of Bengal led their support to a great extent especially during the first half of the twentieth century. The popular policies adopted in the dawn of Independence in India were very much beneficial for the Bengal silk industry especially for the survival of its rural populace.

The village Chak-Islampur in Murshidabad came to be known as a big silk reeling and weaving centre. Besides, Chak-Islampur few other principal centres of Silk Industry had made some historic efforts for the resurgence of Murshidabad Silk. During the first half of the 20th century, Bengali silk merchants of Chak-Islampur, Berhampore and Meerzapur attempted in their own way to resurrect this artisanal Industry. They engaged some reelers, spinners and weavers of the villages of Chak-Islampur, Harharia, Dangapara, Chhayaghor and few other neighbouring places in the producing of Silk and Matka fabrics and other allied work under their supervision.

Incidentally, it is interesting to note how the famous silk industry was integrated with the Khadi industry and was saved. The Bengal silk merchants succeeded to bring fame for this industry before the First World War. But the position became worse in the post-war period. The world economic depression (1929) struck the industry hard. Famous Bengali silk merchant Lalitmohan Saha of Chak Islampur, Murshidabad attempted his best to get in touch with Sri Jerajinjee, principal member, All India Spinners' Association, Bombay Province and founder-member of Khadi Bhandar, Kalba Devi Road, Bombay, who was at that time entrusted with the work of marketing the Khadi products commercially by Mahatma Gandhi. Sri Saha tried to convince Jerajinjee for taking the silk industry within the Khadi fold as Silk was the only main indigenous village industry of Murshidabad District. The non-co-operation movement was in full swing at that time and Mahatmaji was in leading role for the survival of all Village Industries. By that time the charka movement had taken root among the freedom fighters and more and more people were being attracted with the fold of Khadi movement. Sree Gandhi Ashram was established at Meerut by Acharya Kripalinjee with the help of some of his associates and they were trying for the revival of different Village Industries including the Murshidabad Silk. Lalitmohan Saha at last succeeded to contact Jerajinjee, the dedicated Khadi worshiper at Bombay. He tried to convince him that the Silk Industry was a purely indigenous Cottage

Industry and it should be taken in the Khadi fold (Rahaman, 2009). He then sent his son-in-law Kalipada Choudhury to Ahmedabad to move the matter before Sree Sankarlal Banker, the then General Secretary of All India Spinners' Association. In the same time Sree Anil Chandra Mukherjee, the then General Secretary of Sree Gandhi Ashram, Meerut took great interest and played an important role in it. In the year 1925, the Stalwarts of All India Spinners' Association, after being convinced, sent Jerajinjee to Murshidabad. He visited Chak-Islampur and other Silk Centres and was pleased to recommend Silk Industry to be taken under the Khadi and Village Industries fold. But Mahatmajee did not accept it in early days.

However, Gandhiji was persuaded by the political luminaries and constructive programme workers that this silk industry deserves inclusion in the Khadi. Gandhiji's favourite Shri Satish Chandra Dasgupta of Sodpur Ashrama, his wife Smt. Hemaprabha Dasgupta, Shri Anil Chandra Mukherjee of Abhoy Ashram, Shri Shankarlal Banker, Secretary, All India Spinners Association, Jerajinjee, Acharyya J. B. Kripaliniji, Dwarakanath Vishnu Leleji pleaded with Gandhiji in favour of the silk industry. Gandhiji advanced two reasons against the silk industry being looked upon as Khadi. First, this industry is prone to violence. Second, it only concerns the rich. However, he sent investigators to enquire into the details of this industry. They reported that the fate of a large number of mulberry planters, rearers of silkworms, spinners, reelers, weavers and others were integral to the industry. He further realised that the death of the silkworm would be a natural death. A silkworm would complete its cycle of life in the cocoon and pierce it only to die. So causing death of worm in course of the reeling process was minimal violence. He could make out that it would matter not only the rich but so many poor workers were involved in the production of silk fabric. So he gave the silk industry the status of Khadi, which refers to a worker. The silk industry which was almost near to its death bed after the First World War was drawn again after inclusion of it to Khadi. With the Second World War and successive breakout of severe famine in Bengal called the '*Panchasher Manwantar*', Silk Khadi industry suffered a huge setback. The poor weavers, the silkworm rearers, the mulberry planters, the spinners, died by thousands.

The West Bengal Government started working upon the National Sericulture Project in 1989-90. The Development Corporation started the Rs. 64.25 crore project, funded by the World Bank, in order to expand the rural employment opportunities, upgrade the economic situations of the sericulturists and silk-artisans and to widen the markets for silk both domestically and internationally. In 1989 West Bengal brought into force certain laws concerning production, supply, distribution and sale of silk with the view to protect the interests of the Rearers, Reelers and Weavers. At present the work of the protection of the rights of the silk industry has spread well into rural Bengal. In Murshidabad district alone, eight support and assistance centres have been established in Jangipur, Lalbagh, Nabagram, Khargram, Kandi, Jalangi, Raninagar and Beldanga. A factory has been set up at Panchanantala, Behrampore for dyeing and colouring silk sarees. Most of such factories are located in Benaras, Sreerampore and Kolkata. Murshidabad silk sarees have a huge demand base both inside and outside of Bengal.

3. Present Crisis of Silk Manufacturers in Murshidabad District

Murshidabad district occupies a significant place in the field of silkworm rearing and weaving of silk fabrics. The artisanal silk industry thus contributes a lot to the rural economy of the district through raising the standards of life of the rural silk farmers and weavers. As discussed in the previous section, this industry bears a rich historical legacy though presently going through a difficult phase. Large numbers of silk farmers as well as weavers are leaving the industry. In 2002, the total number of silk farmers and weavers were 38,040 and 25,778 while in 2012 it brought down to 14,593 and 15,160 (DoT-Sericulture, Govt. of West Bengal, 2001-02 & 2011-12).

According to the experts, degradation of silk worm races, various administrative and organizational problems are responsible for the subsequent decline of sericulture. Due to physical conditions like climate change, which would often lead to drought and flood, the production of mulberry declined. Similarly, the poor farmers who fail to mobilize easy loans from banks are bound to produce raw silk in lower volumes. It has also been observed that rivalry between ruling party and political parties create chaos among silk producers in this region. The influential factors include attractive job opportunities in metropolitan cities, good and timely wage and the other opportunities of living standards.

Past studies in Murshidabad silk producing region also reveals that sericulture industry in Murshidabad lacks innovation and diffusion technology. The sericulture farmers of this region are more prone to using outdated silk farming and cultivation technology, which is neither fruitful nor as per the expectation new market demand bounded with tough competition and entry of research and development facilities in the field of sericulture (Rahaman, 2009).

The exploitation of Mahajans, middlemen and silk merchants is one of the major problems of silk industry in this district. The farmers, reelers and weavers are bound to sell their product at low price to the local merchants owing to lack of organized market in the district (Das, 2005). The silk co-operative societies do not have enough managerial skill to compete in the open market. They are set up to provide marketing support to the Primary Weavers' Cooperative Societies which again suffer from high interest burden owing to delay in payment of more than Rs. 2 Crore of dues to the societies.

It has been observed that silk artisans in NGOs tied with KVIC do not get their due wage in time, due to operational incompetence. Quality checks of silk through standard laboratories are inadequate in the district. Awareness program for upgrading marketing policies is lacking. Experiments with raw materials, yarn, fabrics, higher processing methods such as dyeing, printing, twisting, packaging, diversification of products as per customers' choices are practically absent. Thus less profit earned by the silk merchant induces the entrepreneur to lower their rate of investment and hence lower invention, which in turn leads to low diversification of product and low demand and limited productions with higher average cost and hence again lower profit. Mandal (2015) explains a vicious cycle of poverty keeps the silk manufacturers of the district in its state

of destitute. Biswas (2005) also explained that low organizational forms and technological changes are connected with low income generation of rural based cottage industries. Income generation by Murshidabad silk weavers has largely been attributed by the traditional technology with improvement product design. It has been found that value addition per labour by this moderately employment generating artisanal silk sector in Murshidabad is in the tune of Rs. 5850/-, while the capital per labour value is comparatively less, i.e., Rs. 3040/-. This clearly indicates the technology is grossly labour intensive (Biswas, 2001).

4. Research Methodology

The secondary data source is not sufficient to find out all those determinants and therefore the paper will spend on the results of the primary survey, we have undertaken for this purpose. Using stratified random sampling four development blocks of the Murshidabad districts have been identified namely, Khargram, Raninagar-I, Hariharpara and Berhampur, where a large section of inhabitant is attached with the vocation of silk farming as well as weaving. Using the similar technique two villages from each block have been identified for carrying out the primary survey. Under Khargram Block, Nagar and Margram villages have been chosen, while the chosen village in Raninagar-I Block was Chak Islampur, Hariharpara Block was Mamudpur and Berhampur Block was Kashimbazar, respectively. Thirty silk manufacturing households (including silk reelers and weavers) have been chosen from each village and thus in total 120 households have been chosen as respondents to our queries. Meanwhile a structured questionnaire we formed based on the research hypothesis and respondents have been chosen in random manner to answer those questions. The responses collected from each household have been tabulated and OLS have been applied to test the significance of the research hypothesis.

5. Econometric Model of Income Generation

Exodus of large number of silk manufacturers, during the last two decades, has been identified as the core issue of this age-old artisanal silk industry in Murshidabad district. This logically raises the doubts and questions regarding stability of income generation in this particular sector. On the contrary, if silk farmers, rearers, reelers and weavers could derive stable and high income, they would rather stick to this domestic household industry and expand their business. This boils down to our core research questions to find out the factors responsible for affecting income of the artisanal silk sector of Murshidabad district. Previous research analysis and our own field survey helped us to construct our hypotheses, which need to be tested consequentially.



Fig 1. Murshidabad District : Survey Blocks (Khargram,Berhampur, Raninagar-I, Hariharpara)

Birthal et. al. (2014) explained few factors as significant explanatory variables of income sources from farm-households in India, which includes land productivity, landholding size, numbers of workers, proportions of female workers, access to farm credit, education level of farmers and social groups (e.g., SC and ST). The income share of agriculture has been revealed to be positively associated with land-size holding, while other income sources become less important. The effect of agricultural productivity is also influencing the income sources of agricultural farmers and higher profit in agriculture keep the farmers in agriculture. Again Umunnakwe (2014) derived few significant factors influencing the non-farm agricultural income of the rural youth. Those are marital status, family occupation, respondent's education, employment status, rural life preference, achievement motivation, economic motivation. Roy and Roy Mukherjee (2015) through their primary data analysis on Malda district of West Bengal infer that man-days creation for their avocation and technical efficiency significantly influence income generation in rural sericulture sector while cost of implants has a serious detrimental impact on revenue generation by the silk artisans. It has been observed that lack of awareness regarding institutional credit facilities and financial illiteracy could be held as a chief factor

responsible for the miserable situation of handloom weavers of Nadia district. Fragmented farm-size, outdated machineries and exploitative village moneylenders only accentuated their misery (Roy, 2017; Roy & RoyMukherjee, 2015).

Our artisanal silk sector is a combination of farm and non-farm income. Our field experience and past studies in this specific field helped us to identify certain factors, which may have significant influence on the income level of sericulture manufacturers of this area. Our hypotheses are whether the following factors are determinant of household income of the silk manufacturers and silk weavers.

- (i) **Age(x₁):** Age is supposed to have a significant influence on the household income of the silk artisans and weavers. Young age is assumed to be energetic while matured age is a proxy indicator of experience.
- (ii) **Education (x₂):** Education is also an indicator of income level of silk weavers and growers, as it enriches the artisans with special skill and knowledge.
- (iii) **Language Efficiency (x₃):** It is supposed to have influence over the silk grower and weavers' income through enhancing organizing skill and efficiency in business. The weavers, who are not conversant with Hindi, may face problems in carrying out trade and commerce with merchants from other states.
- (iv) **Family Members(x₄):** Higher family members are supposed to have a positive influence on income of the silk weavers, as household income always remains a product of collective efforts.
- (v) **Sanitation(x₅):** It is related with health parameters of the silk weavers. It improves health condition and thereby income earning capacity.
- (vi) **Ownership of Bicycle, Radio, TV (x₆):** The global multidimensional poverty index by the OPHI (2010) has indicated these factors as determinants of 'non-poor'. We feel these factors as important determinants of business communication which can raise the level of household income.
- (vii) **Price of Silk (x₇):** Price of silk is a chief proponent of determining the level of income of the silk weavers.
- (viii) **Profitability(x₈):** It is considered to be an important determinant for the silk manufacturers and weavers to continue his business and thereby earn income.
- (ix) **Labours [male(x₉) & female(x₁₀):** Male and female both the labours in silk manufacturing and weaving, have their own attributive factors to influence the level of income. Male labours have their greater physical strength and women have their greater tenacity power to carry out the art of weaving and reeling work.

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- (x) **Female wage rate**(x_{11}): Since these activities are part of the unorganized sectors, women workers are being exploited than their male counterpart. Whether lower female wage rate actually enhances the level of income of the household farms would be an important part of the study.
- (xi) **Cost of Production**(x_{12}): If cost of production positively influences the income of the households of silk weaving farms, then we would have to assume that richer artisans can only have capacity to earn high income.
- (xii) **Male members in family** (x_{13}): Number of female workers in family always have higher chance to raise the level of this household income as silk manufacturing sector which in turn implies male dominated households would have inverse impact on the income derived from silk manufacturing.
- (xiii) **Women power and autonomy**: If the female member of the silk manufacturing and silk weaving family members have power and autonomy to sell their product (x_{14}), take the credit seeking decision(x_{15}) and expenditure decision(x_{16}), they can earn higher level of income.
- (xiv) **Morbidity of Women**(x_{17}): If the women members and workers are largely diseased more often than not in a year, which would surely hamper their level of household income.
- (xv) **Religion** (x_{18}): Murshidabad is a Muslim dominated district as we find 66.28% of the whole population in the district is Muslim (Census, 2011). Therefore religion may also have an impact on choosing silk manufacturing as their livelihood.
- (xvi) **Children in Family** (x_{19}): Silk industry is often alleged to be a sector where children are also involved, especially in the weaving phase of production. These children are mostly household children who help their parents to earn higher income.

Primary household data have been collected through field survey in villages of Khargram, Raninagar-I, Hariharpara and Berhampur blocks in Murshidabad district. These four sericulture and silk manufacturer rich blocks have been selected using stratified random sampling. Under Khargram Block, *Nagar and Margram* villages have been chosen using multi-stage sampling, while the chosen villages in Raninagar-I Block, Hariharpara Block and Berhampur Block using the same methods were *Chak Islampur*, Mamudpur and Kashimbazar, respectively. Thirty silk manufacturing households (including silk reelers and weavers) have been randomly chosen from each village and thus the total 120 households have been chosen as respondents who answered the structured questionnaire. The broad descriptive statistics of the collected data are explained in table 1.

Table 1: Descriptive Statistics

Description	Unit	Mean	Standard Deviation
Age of HH Head	Years	41.85	10.42
Education of HH Head	Years	5.28	3.5
Male Family Members	Numbers	2	1
Male Labour/HH	Numbers	2	1
Female Labour/ HH	Numbers	1.5	0.8
Cost of Production	Rs./ annum	1976.67	1660.5

Table 1 explains that the average households are middle aged (i.e., around 42 years old) with only five years of school education on an average. The average male family members are 2 while average hired male worker is also 2 per household. The numbers of hired female workers are less and cost of production is around Rs. 2000/- per annum.

Multiplier Regression Model was used to determine the significant factors influencing the level of income of the silk manufacturing and weaving household. The Model is assumed to be a linear one:

$$Y = a + b_i x_i + u_i, \text{ where } i = 1 \text{ to } 18$$

where, Y = Income of the silk manufacturing/weaving households

a = constant;

b_i = Coefficient of x_i , it indicates how much Y will change if x_i changes by 1 unit

x_i = explanatory variables of Income of the households ($i = 1$ to 18)

u_i = Error Term

The collected data were cleaned and tabulated and regression was run using the OLS technique. The F-statistic of the model was found to be less than 0.0001, which ensures the goodness of fit of the model. The diagnostic check ensures that dependent and independent variables are linearly related through the scatter diagram of predicted versus residuals. On the other hand, even scatter of residual shows that the model is not being affected with heteroscedasticity. All the values of VIF (Variance Inflation Factor) are less than 5, which ensures that there exists no serious multicollinearity problems within the regressors of the models. The table of estimated coefficient is as follows:

Table 2: Estimated Coefficients

Variables	Coefficients	t-statistic	Significant Level	VIF
Intercept	14220	1.67	0.09	0
Age(x ₁)	-256.19***	-3.78	0.0002	1.39
Education (x ₂)	-339.604	-1.73	0.086	1.37
Language Efficiency (x ₃)	7528.879***	3.88	0.0002	1.22
Family Members(x ₄)	3325.369***	4.72	<0.001	3.02
Sanitation(x ₅)	3741.368**	2.62	0.0103	1.38
Ownership of Bicycle, Radio, TV (x ₆)	27347***	3.94	0.0002	1.18
Price of Silk (x ₇)	1.896	1.72	0.08	1.28
Profitability(x ₈)	7838.917	1.95	0.0541	1.17
Labour_Male(x ₉)	3004.765***	4.34	<0.0001	1.93
Labour_Female(x ₁₀)	-3264.047***	-4.33	<0.0001	1.44
Female wage rate(x ₁₁)	-35.722	-1.95	0.0536	1.13
Cost of Production(x ₁₂)	-1.45***	-2.9	0.0045	1.26
Male members in family (x ₁₃)	-2829.032**	-2.44	0.0166	2.85
Women autonomy is Sales (x ₁₄)	2660.260	1.95	0.0541	1.19
Women autonomy is Credit Decision (x ₁₅)	3689.518***	2.82	0.0058	1.26
Women autonomy in Expenditure Decision (x ₁₆)	-2414.547***	-2.89	0.0047	1.22
Morbidity of Women (x ₁₇)	-5268.126***	-3.54	0.0006	1.39
Religion (x ₁₈)	2633.800	1.84	0.069	1.43
Children in Family (x ₁₉)	-2281.159	-1.95	0.0545	1.72

R² = 0.6247 and Adj R² = 0.5534 ; F (df = 119) = 8.76 and P Value <0.0001

***** Significant at 1% Level; ** Significant at 5% Level**

5.1 *Interpretation of Results*

The value of $\text{Adj } R^2 = 0.5534$ indicates that the model can explain 55 percent variation of dependent variable through the independent variables. The significant variables derived in this proposed model which significantly influences the annual level of income of the silk manufacturing households positively are ‘language efficiency’, ‘number of family members’, ‘ownership of bicycle/motorbike and television’, ‘male labour force’ and ‘women autonomy in credit decision’ as well as ‘women’s expenditure decision in the family’. Language efficiency itself can raise the level of income of a household compared to a non-language efficient household. Similarly, being a labour intensive household activity, rise in an adult family member of a silk manufacturing family can raise its annual income. Ownership of cycle/motorbike and Television has the capability to augment the level annual income, while rise in a single male worker in the workforce can raise the level of annual income of the household too. Again, women autonomy in credit decision positively influences the annual income generating capacity of the household compared to its counterpart.

The significant factors which inversely influences the level of annual income of the silk producing households are ‘age of the household head’, ‘female workers’, ‘cost of production’, ‘male family members’, ‘morbidity of female’ and ‘expenditure autonomy of female in the family’. Lower the age of the household by one year, higher would be the level of annual income. It implies higher vigour and vitality actually pays higher return than the experience and maturity. Rise in female labourers ultimately lowers the level of annual income. As a matter of fact, the essential part of the female works is usually being performed by the domestic women workers. The hired male workers are better paid and their productivity is also higher for that reason. The hired women workers are usually poverty stricken women members of the society, who are ready to work at a below subsistence wage rate. Naturally their involvement hardly poses any significant impact to the annual income derived by the household. The same interpretation is true for female wage rate, being a significant but negative determinant of the annual income earned by the silk producing household. Higher cost of production also brings down the income generating capacity of the household. Therefore, it can be said that silk industry is not using pro-rich bias technology, where high cost of implements are better rewarding.

Again rise in the male members of the family lowers the level of income of silk producing family from silk business, as the bigger family would try to diversify their business through male labour intensive work and not sericulture. This diversification lowers their income in silk production. Morbidity of female households necessarily lowers the income level of the household and expenditure autonomy of the family also significantly lowers down the income level of the silk producing household. Though women autonomy in a Muslim rich region is a difficult proposition to explain, as how much autonomy is really borne by the women never remains beyond doubt.

6. Policy Suggestions

Based on the results of data analytics few policy suggestions can be offered. Rural income augmentation is not only viewed as a primary source of development exclusively for the rural regions but also as a parameter which stops rural-urban migration. Enhancement of language efficiency has proved to be a positive factor of boosting income of the silk producing families. Therefore, the government should take emergent step to raise the level of language efficiency of the silk producers and traders. The government should also raise the level of sanitation facility of the silk reelers and weavers and the communication goods like bicycle, television to be provided. Lower cost of production would eventually raise the level of income earned by the silk weavers and reelers and therefore Government should subsidize the cost of production for the silk reelers and weavers. Credit autonomy for the women workers can be encouraged through encouraging formation of more and more Self Help Group and providing concessions to women borrowers. Health facilities of the women workers could be improved by launching concessional health insurance scheme to the women workers related in this field. Then only we can expect to have a higher level of income from this unorganized silk producing sector and possibly could hold back the exodus of the silk artisans in districts of West Bengal.

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