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A Study on Productivity & Empowerment of

Women Intensive Sericulture Sector of West Bengal*

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Abstract

Sericulture is a women intensive sector where 60% of the workers are either family workers or hired female workers. Productive skill makes the presence of women invincible both in pre and post cocoon sectors. This larger participation is expected to raise their level of empowerment too. Higher level of empowerment is expected to induce the woman to usher improved productive technology. However field survey in Malda districts of West Bengal reveals a complete bleak picture. Neither productivity level, nor the empowerment level have reached the desired level, which calls for an immediate intervention and revision of policies.

Keywords: Sericulture, Productivity, Empowerment, Malda, West Bengal.

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1. Introduction

Sericulture is a women labour intensive household industry throughout the globe. Almost sixty percent workers both in pre-cocoon and post cocoon sectors are either family women or hired women workers. In India 91.78 lakh persons are engaged in sericulture during 2018-19, cultivating mulberry in 23.5 lakh hectres of lands (CSB, online). So it can be assumed that around 55 lakh persons engaged in sericulture during 2018-19 are women workers. A study has shown that India is home of 12.7 crores of working women, out of which 90% are engaged in unorganized sectors (Goswami and Bhattacharya, 2013). Participation of these women workers is mostly found in marginal and casual employment due to inadequacy of skill, illiteracy, restricted mobility and lack of individual status (Chari, 1983). Another study revealed that women labourers in India are mostly engaged in agro-based household sectors as unpaid labour where the prominent sectors are handloom, sericulture, dairying, fisheries, small animal husbandry and handicrafts (Mehta and Sethi, 1977). Out of 6.39 lakh villages in India, sericulture is practiced in 52,360 villages (8.2%) and generates livelihood to around 9.48 lakh families (Savithri et.al., 2013).

Among five traditional raw silk producing states, West Bengal is the third largest mulberry raw silk producing state in India, which yields 11.5% of country's total production (CSB, Annual Report 2017-18). West Bengal occupies highest rank in terms of 'families involved per village ratio', i.e., 48.9% (Roy, 2015a). The reason is spatial concentration of silk production in only three of its districts, namely, Malda, Murshidabad and Birbhum. In 2017-18, West Bengal produced 2540 MT of mulberry raw silk utilizing 16,480 ha of areas under mulberry cultivation and involving 1.21 lakh sericulturists, 24,000 reelers and 31,088 weavers (CSB, 2019). As women have high level of participation in all these sericultural activities, this income generation seems to improve the decision making ability in the production process which in can be expected to improve the sericultural productivity (Venkatesh et. al., 2010). This paper will shed some lights on various dimensions of the productivity and empowerment of women in

sericulture of West Bengal. It also intends to construct women empowerment index especially for the women workers attached with sericulture and thereby want to measure their level of empowerment.

2. Methodology

Malda is the largest mulberry raw silk producing district in West Bengal, manufacturing 67.93% of the state production during 2016-17. Kaliyachak Block-I & II were chosen as the primary survey areas since 90% of mulberry cultivated area and sericulture farms are clustered over this region. Eight villages namely Marupur, Alipur, Shershahi, Sujapur, Gayesbari, Mothabari, Feranchak, Jodhkabil were selected through stratified random sampling method. Around 25 household farms were chosen per village using random sampling and women representative members were asked various structured questions connected with decision making abilities. On the basis of their response, the data were tabulated. Our objective was to investigate the reasons behind productivity inhibiting factors existing in sericulture and measure the level of empowerment of women in sericulture in West Bengal using our own constructed index.

3. Women Labour Demand in Sericulture Farm : Issues of Productivity

Women's precision and patience make their presence more invincible in silk-worm handling. Since traditions and customs of society in Indian rural context do not encourage the majority of rural women to work outdoors, sericulture proves to be a boon. It gives a wide opportunity to women who can carry on with all their contributory work even after attending to their regular household chores. Thus, sericulture, besides agriculture, is ideally suited for women who are able to contribute as family labour in the rural areas.

Jayaram et.al (1998) found that under irrigated conditions every acre of sericulture generated employment of 247 men and 193 women round the year. They also inferred that the small scale mulberry farms provided ample scope for employment of family labour and thereby bearing the potential to solve the problem of seasonal unemployment. Lakshmanan et al. (1999) found that female labour is proportionately higher in all sericultural activities, which is surely due to their specialised skill and

productivity. Saraswathi and Sumangala (2001) observed that within indoor activity of silkworm rearing, women participation was as high as 94.67 % and that except for the peak period, the entire sericultural activity is conducted using productivity of family labour.

Farm women have certain productivity attributes, which are of special relevance to sericulture development.

(i) A farm woman is always concerned about the well being of the family. So when larger participation is seen in activities of sericulture that is surely due to their productive efficiency. Silkworm rearing calls for intensive attention as well as motherly care, especially, in the larva stage. Identifying and then collecting mature silkworms and putting those on spinning trays require a great deal of specialized skill and patience. Women members can ideally fit into the round-the- clock schedule of sericulture (Banerjee, 1990).

(ii) According to the Central Sericultural Research & Training Institute, Mysore (Guide to Sericulture Extension, CSB), women have proven themselves to be better learners. They have better capacity to concentrate, listen, integrate and recall. They are also easily adaptable and thereby can be expected to reap the benefit of better technologies.

(iii) Silkworm reeling & spinning requires nimble fingers which provides special edge to women workers to keep attached with post cocoon sector of the artisanal silk industry.

(iv) Women are also seen to be better managers of credit. Therefore, with larger participation of woman and greater access to income from sericulture, the rate of savings generated from it can lead to high degree of asset formation, which may lead to sustainable development in sericulture (Venkatesh et.al., 2010).

Usha Rani (2007), in one of her studies in Andhra Pradesh has observed that the establishment of one acre mulberry garden for rearing 300 disease free layings (DFLs) of silk worms in two months generates 96.36 man days of employment, of which 72.70 percent are by women. She has also noticed that cocoon cutting and sexing and egg incubation are exclusively done by women.

Sarkar, Majumdar and Ghosh (2017) conducted a study in few villages of Murshidabad distrit, West Bengal, to assess the role of women workers in sericulture which included observations on the share of work load borne by the women. For example, mulberry garden management needs higher share of women workers than establishment of mulberry garden. Silkworm rearing, reeling and twisting also require proportionately higher percentage of women workers (see table-1). In fact, women workers perform comparatively more delicate but less hazardous jobs in mulberry cultivation, like preparation of cuttings, planting them into nursery or into the field, application of manure, fertilizers, etc. Few activities including weeding, harvesting of leaves and their transportation to markets are exclusively performed by women workers. However, it has been observed that landless women workers are hired in peak periods of sericulture in the villages of West Bengal, thus providing work opportunities to the marginalized women. For small and poor sericulture farms, family women take care about silkworm rearing as it often requires round the clock care. The family women undertake this cumbersome work with the hope that they will also become an anchor of their family. They do leaf plucking, removal of weeds, bed cleaning, worm feeding, picking the right worms and placing it into bamboo tray (*chandrika)* and so on. Researchers opined that an operation like leaf plucking is skilled and delicate. The workers must know which leaf is to be plucked. This specialized productivity skill makes their role more invincible in sericulture sector. However, role of women in cocoon market is rarely observed in West Bengal. When it becomes dealing with cash, the male members of the family take proactive role.

In post cocoon process, the reeling of silk is largely done by family women following the traditional crude method of 'Charka' (wheel). Household women and non farm family women are mostly involved in producing silk yarn. Improved cottage basins are mainly used by large farms and their produced silk yarn are relatively better than the charka made silk. These cottage basins also employ large number of women workers and child workers mainly due to their low wage demand. Women are also employed in silkworm egg production, manufacturing of sericulture appliances like bamboo trays, leaf baskets.

The gender segregation of workers in sericulture is historically evolved. But, whether it is due to their specialized productivity skill or as cheap labour, is a matter of research debate. Roy et.al (2012) have shown that low productivity of land is no way responsible for lower production of raw silk in West Bengal compared to Karnataka, but still sericulture failed to develop evenly across the state. Malda, Murshidabad and Birbhum are the only three districts which produce 90% of mulberry raw silk. Nature of soils, climatic conditions and generation borne experiences of sericulture artisans, play the key role. When male workers migrate outside the state in search of work, they leave the entire burden of the household to domestic women. If the rural households are to be made economically viable and self-sustaining, the employment and income generation by the rural women needs to be revamped (Chattyopadhyay et al., 2008). Sericulture, with its characteristics of being low capital intensive with low risk attached, and minimum gestation period with comparatively high returns, is ideal for the women of the household. Trivedi and Sarkar (2015) calculated that sericulture is capable of generating more income than other cash crops like paddy and wheat in West Bengal. They have surveyed the villages of Murshidabad, West Bengal and calculated that sericulture can generate an annual income of Rs. 52,900/- from one acre of irrigated land (assuming it can be practiced 4-5 times a year) while multiple cropping (viz., paddy in summer, paddy in monsoon, mustard in other season) from the same plot of land can generate Rs. 42,550/-. Thus, for the villages of Malda and Murshidabad, where majority of male workers are migrant workers, sericulture seems to be an ideal and sustaining livelihood for the women households. Statistics reveal that growth in silk production is highest in Murshidabad, i.e., almost doubled between 2011 and 2017, while the rise is not significant in Birbhum. Malda ever remains the largest raw silk producing district in our state (See Table 2).

3.1 Productivity Improvement Related Issues

Agricultural extension (i.e., successful application of fruits of scientific research and new technology) can play crucial role in boosting agricultural productivity. Improved productivity acts as an engine of pro-poor economic growth (Raghunathan et. al., 2019). In India, per hectare productivity of mulberry silk was

found to be very low during 1960s and 1970s, i.e., around 14-20 kg of mulberry raw silk per hectare (Rai and Dwivedi, 2015). In 1980s and '90s, significant hectare productivity improvement was observed which was undoubtedly the fruit of successful extension work (Mote et. al., 2014). The average hectare productivity of raw silk in India has shown a fluctuating trend over the period 2009-10 to 2018-19. From 88.92 Kg/ha in 2009-10, the land productivity of raw-silk rose to 100.9 Kg/ha in 2011-12, declining thereafter to 95.93 in 2013-14 to again rose to 107.84Kg/ha in 2018-19. However, per hectare productivity of raw silk is much higher in West Bengal compared to national average, although it shows a declining trend very recently, i.e., during 2014-15 to 2018-19. The per hectare productivity of raw silk diminished to 153.57Kg/ha in 2018-19 from 161.68Kg/ha in 2014-15, However, the area under mulberry plantation had risen and it will be more practical to analyze this trend in along with changing trends in labour productivity.

As a matter of fact, the labour productivity trend shows marginal fluctuations during 2009-10 to 2018-19. From an average of 2.39Kg raw silk production per person in 2009-10, it declined to 2.25kg of raw silk/person in 2010-11 and then continually showed a rising trend and ultimately increased to 2.76 kg of raw silk production per person in 2018-19. But if we look back further over the planning period, it revealed a substantial fluctuating trend. Starting from an average of 3.35Kg/person per annum in the First Plan, it reached to an average of 4.63 Kg/person/year in Third Plan and then it dipped down to 2.594 Kg/person per annum in Ninth Plan (Roy, 2015b). The year 2001-02 showed a rise in labour productivity to 6.06 Kg/person. But the year 2010-11 exhibited a steep rise in productivity, i.e., 15.78 Kg/person which marginally declined to 14.59Kg/person in 2017-18. This labour productivity in West Bengal remained much higher than the National average which was mainly possible due to technological induction (See Table 4). Unless the women workers are more favorable to this technological updates, this rise in productivity would never have been possible.

Sericulture in West Bengal (especially in Malda and Murshidabad districts) is largely controlled by the women members of the household farms as these two districts have high numbers of male out-migrant

workers. According to market experts, the technology which is conducive to raise productivity is input cost intensive, which is not affordable by most of the poor women artisans. Often there was a lack of concern for appropriate technologies which matched with low resource base, lower risk taking ability and the overall production strategies of the poorer sections. This technology bias itself works against the productivity of the poor women workers of sericulture (Venkatesh et. al., ,2010). Sandhya Rani (2006) has observed that with the introduction of more farm machinery, women's labour is getting further and further pushed into unskilled category and thereby the whole process ensures continued marginalization of women workers in sericulture. However, analyzing the resource base efficacy, research studies (Das et. al., 1999; Manjunatha et.al., 2018) exposed that marginal farmers have greater productivity potential and therefore they should be given sufficient help to boost up the overall productivity. Another study established inverse relation between farm-size and productivity (Das et.al., 2000) and found the net return would be optimum at mulberry land holding of 0.2 hectare in most of the districts of West Bengal.

However, productivity of women workers in small farms is hampered by the drudgery associated with their farming practices. While surveying 8 (eight) villages in Malda districts we found several kinds of productivity inhibiting drudgeries faced by seri-women, like (a) financial exploitation faced by the family workers as they are never paid in cash terms for their endeavours; (b) they work for long duration starting from 4.00AM to 6.00 PM, which degrades their health condition; (c) while cooking and reeling cocoons in boiled water, their fingers often suffer burn injuries; (d) hot and humid air and smoke in reeling units affect their lungs; (e) most of the seri-women workers suffer from health issues like headache, giddiness, burning of eyes and throat, excess heat in the body etc; (f) women workers experience fatigue while handling rearing trays, plucking leaves and cleaning rearing rooms, (g) for charka reelers the sitting posture is strenuous and long time work in that posture worsen their health status; (h) hired women workers additionally face problems of wage inequality with the male workers in sericulture; (i) owners of the farm prefer to pay the hired women workers more in kinds than in cash; (j) health insurance scheme for the women workers is yet to be reached in much of these remote villages;

Our major findings from the primary survey in villages of Malda district revealed that out of an average of 14 family workers in one household, women workers are 6 and among them almost 5 are from family and 1(one) is hired woman worker. An average daily working hour is more than nine hours and most of the women are illiterate or functionally literate. This low level of education itself works as a hindrance in technology transfer, which in turn affects their productivity. Health issues are observed among 62% of the households and wage gap between male and female hired worker is more than Rs. 60/- per day. All this affects the productivity of women workers and thereby affects the progress of sericulture in the villages of West Bengal.

However, Raghunathan et al. (2019, p.567) opined that extension directed at women workers bears the potential to increase the technical efficiency and improve adoption of technologies which benefit women. Again interventions aiming to women getting updated with recent technical breakthrough may be achieved through empowering women and enhancing their decision making role. Increased decision making role can even reduce wage gap (Hertz et.al., 2009) and increase the adoption of drudgery reducing technology (Khan, Kishore and Joshi, 2016). Thus, productivity improvement seems to be impossible without empowerment in household industry like sericulture.

4. Women Empowerment in Sericulture: Multidimensional Issues

Despite showing specialized productivity, tenacity and persistence at work, efforts put forward by women workers remain unnoticed and they continue to work as unpaid family workers. But this perception has been changed for the better in recent years regarding the role of women in sericulture owing to the significance of the critical operations that they perform as well as their share in the production value chain although their participation in decision making regarding family expenditures can hardly be observed. Venkatesh Kumar et. al. (2010, p.179) have observed that sericulture women out of necessity are also compelled to work outside on others' field to supplement their family income, yet they have very little say regarding the earning or any decision regarding where she is to work and how much she is to be paid.

Care Pathways' *Theory of Change* (2013) states that rise in productivity of small and poor women farmers in turn helps to increase her income earning capacity while empowering them. Contribution and influence over household income helps the domestic women to participate in decision making process which raises her self confidence and self esteem too. Sinha (1989) pointed out that when women from sericulture families forgo alternative paid employment in order to assist sericulture; their empowerment rises. However, Charsely (1976) suggests that for middle class sericulture families, silkworm rearing represents a suitable domestic activity for the women folk, who would not be expected to work outside home. In this situation the intra family power remains unaffected. When women's labour becomes an essential function in production function and male enjoyment of conspicuous consumption becomes dependent on it, that raises the female power. When sericulture is taken up by the lower class families, women power within home could decline.

Roy Choudhury et. al. (2011) found that in sericulture enterprises, decision taken by women themselves are restricted to activities such as quality of mulberry leaves selection, maintenance of hygiene in rearing houses etc. In several studies it has been exposed that although women workers participated in large numbers in the total work force, their status in production decision is minimal (Vekatesh et. al.,2010; Roy, 2015b). In the chain of production they just act as the obedient workers, be it in relation to spacing silkworms in bamboo tray or about sorting out diseased worms. Regarding scale of production, timing of production, technology of choice, they have virtually no power in decision making. In fact in a sericulture farm, since the land belongs to the male member of the family, his decision dominates over others and he becomes the main sericulturist. This non recognition of women workers virtually lower her self esteem and deprive her right to various institutional services. Women are supposed to be better managers of credit, but bankers are hesitant to advance credit to them as they can't provide land as security and/or any other collateral. Thus the possibility fails to mature and women empowerment in sericulture of West Bengal remained as pipe dream.

Larger participation of women workers in sericulture would cause an improvement in their decision making ability in the production process, which in turn is expected to improve sericultural productivity. While working in the two Gram Panchayats of Malda district of West Bengal, Roy (2015b) experienced significant quantitative presence of women workers in the total workforce which was supposed to boost their group confidence. Empowerment always makes a match between economic opportunities and their capabilities. Most of the time due to lack of concern, economic opportunities are lagging behind their capabilities. Increased participation in labour force would raise their self esteem and would inspire them to involve in decision making activities both in farm and households, which in turn would enhance women's work agency.

4.1 Construction of Women Empowerment Index for Women Workers in Sericulture

Women's Empowerment in Agriculture Index or WEAI (IFPRI, 2012) has been introduced by the Global Hunger and Food Security Initiative to overcome the obstacles and economic constraints faced by the agricultural women in LDCs. As empowerment is inherently context specific and shaped by the socio-economic, cultural and political condition, we intend to construct two indicators of women empowerment relevant to sericulture, following the computation method of WEAI. Roy et.al. (2017) also constructed Women Empowerment Index to measure rural empowerment level. Their study indicated that women empowerment being dependent on complex sociological and economic issues, needs to be measured in specific parameters.

For sericulture sector we choose two broad domains for computing the empowerment indices specially, where women are expected to exhibit their power after being financially supportive through this household industry, i.e., (i) Within Family Sphere, (ii) Within Social Sphere.

4.1.1 Family Empowerment Index (C_f)

Within the family sphere, the empowerment of the women depends upon her participation in decision making role in the following three household activities:

(a) Various decisions with respect to silk production

(b) Control on the use of income earned from sericulture

(c) Decisions about health & education of her children (including her own reproductive health)

These three sub-indicators are given equal 1/3 weights to construct 'Family Empowerment Index' in Sericulture (C_f)

$$C_f = w_1I_1 + w_2I_2 + w_3I_3$$

where, I_1 = 1, if the household women participate in decision making of running daily family expenditure;

= 0, otherwise;

I_2 = 1, if the household women participate in decision making about the health and education of her children in the family (including her own reproductive health);

= 0, otherwise;

I_3 = 1, if the household women participate in decision making about her household business, i.e., sericulture.

= 0, otherwise.

$\sum w_i = 1$, i= 1, 2, 3 (w_i being the weight)

All three decisions in a sericultural family are expected to have equal importance. Thus the assumption of equal weights to all three decisions is made, i.e., $w_1 = w_2 = w_3 = 1/3$

Hence, Family Empowerment Index ranges between 0 and 1.

$$0 \leq C_f \leq 1$$

C_f = 1 would imply family empowerment at highest attainable level, which also signifies gender parity at perfect level within family

C_f = 0 would imply absolute disempowerment of women within family structure

Empowerment has not been defined in binary consequence as either empowered or disempowered. Field experience observed women with various degrees of empowerment. According to the index construction, the level of family empowerment among sericulture women in Malda district has been found at the level of 0.25, which is much below the 'adequate level of empowerment', i.e., 0.80. The socio-economic background in the minority concentrated regions is the major reason for this low level of empowerment in sericulture farms where domestic labour force is largely used. An attempt has been made to compute the association between Family Empowerment Index of Sericulture Women and several other socio-economic factors using primary survey data collected from sericulture rich villages of Malda District of West Bengal and some notable results have been found (see table 6).

4.1.2 Social Empowerment Index (C_s)

In order to include the leadership domain of the sericulture women, it is necessary to build a Social Empowerment Index. Being more socially empowered, the sericulture women are expected to take leading role even in marketing of cocoon and raw silk including other outdoor activities associated with this livelihood. We propose three indicators which capture the essence of social empowerment by transforming the family woman to more socially dynamic and mobile one, who are free to operate in the public domain and not confined to the private domain.

(a) Being member of NGO (social interaction)

(b) Being member of Self Help Group (social grouping for economic interest)

(c) Being representative of Political Parties (power of articulating in public)

The three sub parameters are given equal weights 1/3 to construct 'Social Empowerment Index'(C_s) in the artisanal silk sector:

$$C_s = w_4I_4 + w_5I_5 + w_6I_6$$

Where, I_4 = 1, if the household women actively participate in NGO (Non-Government Organisation) being a member of the NGO;

= 0, otherwise;

I_5 = 1, if the household women participate in any Self Help Group as a member of that group;

= 0, otherwise;

I_6 = 1, if the household woman represents any political party either in local or zonal or in higher constitutional body.

=0, otherwise;

$\sum w_i = 1$, i= 4, 5, 6 (w_i being the weightage)

We feel all three social fields are equally important for any household women involved with sericulture for expressing and controlling her social views. So, we place equal weights to all three social participation, i.e.,

$$w_4 = w_5 = w_6 = 1/3$$

SEI also ranges between 0 and 1. $0 \leq C_s \leq 1$

C_s = 1 would imply social empowerment at highest attainable level, which also signifies gender parity at perfect level in society

C_s= 0 would imply perfect disempowerment of women in the society

Empowerment has not been defined in binary outcome e.g., either the woman is empowered or disempowered. Field experience helped to find sericulture women with different level of empowerment. According to the index construction of social empowerment it is found that the value of SEI for sericulture women in Malda district is 0.04, which is again much below than the 'adequate level of empowerment', i.e., 0.80. The socio-economic background especially in the minority dominated regions is the major reason for this low level of empowerment. An attempt is made to compute the association between Social Empowerment Index of Sericulture Women and several other socio-economic factors as mentioned earlier (see table 6).

4.1.3 Summary of Findings

A significant association has been found between the proportion of women working in the family and the family empowerment which is an expected outcome. Increased involvement in income generating activities makes the women more empowered while the social empowerment has an inverse relation with the proportion of women working in the family (though not in significant proportions). One can defend this inverse association by explaining higher the community involvement by woman lowers their chance of involvement in family enterprises. Moreover, sericulture activities of women require time and care which is raised 10 hours per day during the rearing season. Therefore it is quite understandable why a socially empowered woman is less associated with sericulture workforce since she is expected to devote more time in social activities in the public domain.

An empowered woman would always prioritize health and education of her children. So if she is empowered enough, she would not let her children work inside the house. She would rather send them to school instead of supplementing family income against their toil. Social Empowerment has however no significant relation with children workforce in the family. However, more involvement in social activities

by a woman most often burden the girl children at home to undertake household chores and take care of the younger siblings at the expense of her education.

Though women empowerment is often called a tool for raising productivity and thereby poverty alleviation, no significant relation could be observed between income earned by a sericulture farm and empowerment of the women of the household within and outside her house.

The final result is most interesting and it opens few new issues in the arena of Women's Studies. It has been found that the 'education years of the family head' is negatively correlated with 'the family empowered women'. This is a typical patriarchal reflection where educated head of the family (usually a male) seldom shares his decision making activity with the family woman. But, the relation is not statistically significant. However, significant positive correlation is observed between social empowerment of women workers and education years of head of the household.

5. Way Ahead

Though our primary survey results fail to find any significant association between level of empowerment and income earning of a sericulture farm, which is expected to be an outcome of higher productivity, linkages between productivity and empowerment cannot be ignored. Both are mutually dependent on each other for their level of growth. In other words, there exists two-way causation between empowerment and the level of productivity and they are positively correlated. Sericulture rich villages of West Bengal have some typical problems like religion based orthodox attitude that hinders both productivity and empowerment. Changes in the mind set can be achieved through mass campaign and promotion of extension work. More and more SHGs can be encouraged to take up sericulture as their venture. Special concessional loans can provide the incentive to undertake such ventures. Scientific research outcome to raise productivity should be more cost saving and more region specific and cheap resource based. It is only then that we can expect a sustainable development in rural sericulture in West Bengal through higher productivity and higher levels of empowerment of the women engaged in such activities.

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Appendices

Table1: Gender Segregationby Occupation in Mulberry Cultivation & Silkworm Rearing

Sericulture Activities	% Share of Women Workers in Labour Force (1st Year of Establishment)	% Share of Women Workers in Labour Force (2nd Year of Establishment)
Establishment of Mulberry Garden	43	30
Management of Mulberry Garden	73	82
Silkworm Rearing	60	60
Silk Reeling	50	50
Silk Twisting	60	60
Silk Weaving	63	63
Silk Printing	50	60
AVERGAE	57.3	65.7

Source: Sarkar et. al. (2017)

Table 2: District wise Production of Mulberry Raw Silk during 2011-17

Districts	**Mulberry Raw Silk (Metric Tonnes)**	
	2010-11	**2016-17**
Malda	1389.36	1714.62
Murshidabad	252.54	546.96
Birbhum	242.90	262.46

Source: CSB (2019), DoS_Govt of WB (2011)

Year	Labour Productivity of Mulberry Raw Silk in India (kg/person)	Land Productivity of Mulberry Raw Silk in India (kg/ha)	Land Productivity of Mulberry Raw Silk in West Bengal (kg/ha)
2009-10	2.39	88.02	N.A.
2010-11	2.25	96.06	143.46

Table 3: Productivity of Mulberry Raw Silk in India and West Bengal

2011-12	2.41	100.90	N.A.
2012-13	2.45	100.61	N.A.
2013-14	2.48	95.93	N.A.
2014-15	2.66	97.30	161.68
2015-16	2.48	98.01	151.68
2016-17	2.50	98.12	157.85
2017-18	2.56	98.54	155.95
2018-19	2.76	107.84	153.57

Source: Central Silk Board (online)

Table 4: Labour Productivity Trend in Sericulture Sector of West Bengal

Items	2001-02	2010-11	2017-18
Plantation Area (ha)	19013	13138	16480
No. of Silk Farmers (Rearers & Reelers)	110000	92000	145000
No. of Weavers	122000	27260	31088
Total Employment	232000	119460	176088
Silk Production (MT)	1407	1885	2570
Labour Productivity	6.06	15.78	14.59

Source: Govt of West Bengal-Ministry of Textiles (Sericulture), Compendium of Seri States -2019

Table 5 : Findings from Primary Survey in Sericulture rich Villages of Malda District

Serial No.	Parameters related with Women Labour	Average (Arithmatic Mean)
1	Number of Women Workers per household	5.55
2	Number of Total Workers per household	13.9
3	Numbers of Family Women Workers per household	4.61
4	Numbers of Hired Workers per household	1.05
5	Numbers of Female Child Workers per household	0.63
6	Working hours of family women workers	9.6 hours
7	Years of Education of family women workers	3 years
8	Households with major women health issues (%)	62%

9	Daily wage of hired female workers	Rs. 122/-
10	Daily wage of hired male workers	Rs. 168/-

Source: Compiled from Primary Data surveyed in Malda District

Table 6. Correlation between Sericulture Empowerment Index & Socio-Economic Factors

Associated Factors	**Family Empowerment Index (C_f)**	**Social Empowerment Index (C_s)**
Ratio of working women in family	Spearman R= -0.184** Kendall's R = 0.149**	Spearman R= -0.031 Kendall's R =-0.026
Number of Child Workers in the family	Spearman R= -0.162* Kendall's R = - 0.140*	Spearman R= 0.013 Kendall's R = 0.011
Income of Sericulture Farm	Spearman R= 0.126 Kendall's R =0 .095	Spearman R= 0.021 Kendall's R = 0.018
Average years of education of Head of household (usually a Male)	Spearman R= -0.116 Kendall's R = -0.098	Spearman R= 0.176* Kendall's R = 0.153*

* significant at 0.05 level; ** significant at 0.01 level;