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Achieving Sustainable Development Goal by Empowering Women through Mulberry Silk Production in Karnataka, India

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Abstract

Women are considered the weaker section in most societies as compared to men. The existing gender inequality has attracted the world's attention, and 17 Sustainable Development Goals (SDGs) were set up in 2015. Among 17 SDGs, gender equality is the 5th important goal and is also considered in agriculture. Therefore, the present study aims to assess women's empowerment for achieving gender equality goals through the production and marketing of mulberry silk in the Chikkaballapur district of Karnataka. The primary data was obtained from 90 randomly selected sericulture farmers with the help of a pre-tested well-structured schedule. The data was analyzed, and the women's empowerment index was constructed to determine the empowerment level. In the present study, 0.75 was considered as a threshold level of the empowerment index, meaning if the index value is more than 0.75, then there is adequate empowerment among women. The result of the study indicated that about 22.22 % of women were having Individual Empowerment Index(IEI) of more than 0.75, which opined that women had attained adequate empowerment. The remaining 77.78% of women were confined to the process of attaining empowerment. The overall Women Empowerment Index (WEI) was found to be 0.688 for these women who participated in sericulture. It shows that involvement in the production and marketing of mulberry silk could help in women's empowerment in the study area. Despite 60 per cent employment of women in sericulture, the adequate empowerment index for women has not been achieved. Before the researcher, this is the real challenge of how the women empowerment index may be improved to the desired level.

Keywords: *Sericulture, Mulberry silk, Individual empowerment, Women empowerment, index (WEI), Sustainable Development Goal*

Introduction

Over time, women have played a more significant role in Indian agriculture. India's women workforce made up about 65%, according to the 2011 census. Despite their higher participation rate in the agriculture sector, women's access to new technologies, knowledge, inputs or resources, opportunities for capacity building, and control over production resources are hindered, which affects their ability and agency [8]. Employment and livelihoods have left large populations behind, making them more susceptible to shocks. The pandemic has almost completely negated the progress of women's employment in many countries, and they fall back without access to social protection. From 2019 to 2020, women lost 54 million jobs worldwide. Although social protection has increased in certain countries worldwide, women have yet to benefit equally in all countries [2]. The developmental changes occur to ensure that women have equal access to economic resources, including land ownership and control, financial services, inheritance, and natural resources, in conformity with national legislation [3]. Women's empowerment has long-lasting impacts, which involve awareness before the social construction of gender equality, which places women in a social institution like family, caste, class, religion and society or community. The economic empowerment strategy has focused on increasing women's access to economic resources and boosting their financial security [9]. In India, women are traditionally considered to be "homemakers,"

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yet they often work outside the home to support their families. In India, women comprise more than half of the agricultural labour force. Even though the majority of rural Indian women work 16 to 18 hours a day both at home and outside, their role and contribution to the growth of the family have not been completely acknowledged [14]. Women form a significant workforce in the sericulture industry. Sericulture is a significant small-scale agro-based industry that provides jobs for farm women and men [4]. Women constitute 60% of the sericulture workforce. The researchers [5, 9, 7, 14] have shown that women in sericulture industries are involved in mulberry cultivation, silkworm rearing, cocoon production, post-harvest practices of cocoons, and decision-making. Mulberry planting, manuring, irrigation, weeding, mulberry leaf picking, mulberry leaf transportation, and leaf storage frequently include women in sericulture. They are also involved in leaf-cutting, feeding, worm spacing, bed cleaning, mounting, cocoon harvesting, and disinfectant during silkworm rearing. Women were also involved in post-harvesting activities of cocoons like silk reeling, silk spinning, silk twisting, silk weaving etc.; Some are still involved in decision-making [11, 6, 12]. Thus the superiority of women workers in sericulture activities has been developed traditionally. Many rural farming families relied on sericulture for a reliable source of income. It also provided a living for many landless farm and non-farm labourers, strengthening the local economy [15]. The role of women has become increasingly significant in recent years. It is an occupation by women for women because more than 60% of the workforce and 80% of the silk is consumed by women [1]. Hence, it seemed to be appropriate to study the status of women's empowerment and their socio-economic upliftment through mulberry silk production and marketing. The present study aims at assessing the women's empowerment achieved through the production of mulberry silk in the Chikkaballapur district of Karnataka.

Methodology

The multistage simple random technique was adopted to select the farmers in the study area. The present study was carried out in the Chikkaballapur district of Karnataka state. The state was selected purposively on account of being the leading producing state of mulberry silk across the states in the country. Similarly, the district Chikkaballapur was also selected purposively due to amassing a larger area under mulberry cultivation. Further, two blocks, i.e., Chintamani and Shidlaghatta, were selected randomly, and from these two blocks, six villages were selected randomly. The selected villages from the Shidlaghatta block were Doddadasenahalli, Kundalagurki and Handiganala, and from the Chintamani block, the selected villages were Jodihosahalli, Nayindrahalli, and Bhaktharahalli. From each village, 15 mulberry-growing and mulberry cocoon-producing farmers were selected randomly. Finally, 90 sericulture farmers were selected from these villages to collect the primary data with the help of a pre-tested well-structured schedule during the year 2021-22. The collected primary data was analyzed with tabular analysis to find out the share of women's labour in the production of mulberry silk. Women empowerment was analyzed by calculating the women empowerment index (WEI).

Women Empowerment Index (WEI)

Women Empowerment Index (WEI) comprises five Domains of Empowerment (5DE), which measures women's empowerment across five domains. Individual empowerment was assessed through the five Domains of Empowerment. These domains are classified as Production, Resources, Income, Leadership, and Time. The 5 DE and indicators of the Women Empowerment Index (WEI) are given in Table 1.

To evaluate the degree of empowerment at the individual level, a few variables under each domain could be identified and quantified to assess the level of women empowerment across the domains. For capturing the impact of the production domain (I_1), suggested variables or indicators are input in productive decisions (I_{11}) and Autonomy in production (I_{12}), the domain of the resource (I_2) are ownership of assets(I_{21}) and purchase, sale, or transfer of assets (I_{22}). The income domain (I_3) is access to and credit decision (I_{31}) and control over the use of income (I_{32}). The leadership domain (I_4) is group members (I_{41}) and speaking in public (I_{42}). The time domain (I_5) is workload (I_{51}) and leisure periods (I_{52}).

Each indicator's weights are considered to be equal and sum up to a total of one. Indicators should be binary, with a "1" indicating empowerment and a "0" indicating disempowerment. As a result, the aggregate empowerment score would lie between 0 and 1. The Women Empowerment Index (WEI) score was set at 0.75 as a benchmark for achieving adequate empowerment.

Step 1: Individual Empowerment Index for each woman involved in the sericulture activity was eval-

uated separately. A score of 0.75 or higher on the individual empowerment scale is considered adequate empowerment. A woman with a score of 0.75 or higher would have access to production decisions, resources, income, and family matters and be able to make decisions [13].

$$\textbf{Individual Empowerment Index (IEI)} = \sum \mathbf{I_{ij} W_{ij}}$$

Where,
I_{ij} = j^{th} indicators of i^{th} domain
W_{ij} = j^{th} weights for i^{th} domain

Table 1: Domains and Indicators of Women Empowerment Index

Domain (I_i)	Indicators (I_{ij})	Weights (W_{ij})
Production (I_1)	Input in productive decisions (I_{11})	W_{11}
	Autonomy in production (I_{12})	W_{12}
Resources (I_2)	Ownership of assets (I_{21})	W_{21}
	Purchase, sale, or transfer of assets (I_{22})	W_{22}
Income (I_3)	Access to and decision on credit (I_{31})	W_{31}
	Control over the use of income (I_{32})	W_{32}
Leadership (I_4)	Group member (I_{41})	W_{41}
	Speaking in public (I_{42})	W_{42}
Time (I_5)	Workload (I_{51})	W_{51}
	Leisure (I_{52})	W_{52}

Source: [13]

Step 2: After calculating individual empowerment scores, indicator-wise domain empowerment was estimated by the below-given formula was used

$$Average = \frac{\sum_{i=1}^{n} W_{ii}}{\sum_{i=n}^{n} W_i}, i = 1,2, \ldots \ldots \ldots n$$

Step 3:
Group empowerment was measured after calculating indicator-wise empowerment scores. The following equation, based on the women empowerment index construction method, was used to compute this:

Women Empowerment Index [WEI] = W_e + W_n (D_a)

Where,
We = % of women with adequate empowerment
Wn = (1-W_e) = % of women without adequate empowerment
D_a = % of domains in which disempowered women have adequate empowerment.

Results And Discussion

Women play a vital role in agriculture and the allied sector. Sericulture is one of the activities where women do most of the work. With the increasing role of women in agriculture and the allied sector, it is important to assess whether women's empowerment is improving or not with increasing participation. Empowerment provides more access to information or knowledge, more decision-making powers in input use, Autonomy in production, more ability to manage ownership of the resources or assets, powers of purchase, sale and transfer of properties, power to access and control of family income, leadership qualities and ability to speak in public regarding social issues and time management in their life and independence from the constraints imposed on them by customary practices and beliefs. Most people think that the role of women is limited to silkworm rearing, but they are much more than this. Women in sericulture also play a key role in household economic decision-making. It indicates the empowerment of women involved in sericulture. Therefore, the present study was conducted to determine the empowerment status among women involved in sericulture production. Hence, the Individual Empowerment Index (IEI) and Group Empowerment Index were calculated especially for the women who participated in sericultural activities.

Share of Women Labour in Silk Production

Before finding women's empowerment through Individual Empowerment Index (IEI) and Group Empowerment Index, it is important to know women's share in different silk production activities. The involvement of women helps to know how much important role they play in silk production. The share of women in different activities of silk production is presented in Table 2.

Table 2: Share of Women in Different Activities of Silk Production

Sl. No.	Activities	Women	Men	Total
1	Establishment of mulberry plantation (mandays/acre)	25.38 (51.38)	24.02 (48.62)	49.40 (100.00)
2	Mulberry maintenance (mandays/acre/crop)	11.48 (57.00)	8.66 (43.00)	20.14 (100.00)
3	Silk cocoon production (mandays/batch)	18.59 (60.02)	12.38 (39.98)	30.97 (100.00)

continued...

4	Raw silk production (man-days/year)	1167.75 (62.30)	706.19 (37.70)	1872.00 (100.00)

Note: Figures in parentheses are the percentage of total

It is evident from the table that the share of women labour in all the activities is more in comparison to men. In each activity, the share is more than 50 per cent, which shows that more than half of the work is done by women. It was highest in the case of raw silk production, i.e. 62.30 per cent.

Individual Empowerment Index (IEI)

It is important to frame the domains regarding women's empowerment at the beginning of this analysis. The domains of IEI were framed based on the behavioural patterns of women involved in sericulture operations. The various domains and indicators and the weight are presented in Table 3.

Table 3: Weights for Various domains and indicators of WEI

Sl. no	Domain (I_i)	Indicators (I_{ij})	Weights (W_{ij})
1	Production (I_1)	Input in productive decisions (I_{11})	0.10
		Autonomy in production (I_{12})	0.10
2	Resources (I_2)	Ownership of assets (I_{21})	0.06
		Purchase, sale, or transfer of assets (I_{22})	0.06
3	Income (I_3)	Access to and decision on credit (I_{31})	0.10
		Control over the use of income (I_{32})	0.20
4	Leadership (I_4)	Group member (I_{41})	0.10
		Speaking in public (I_{42})	0.10
5	Time (I_5)	Workload (I_{51})	0.09
		Leisure (I_{52})	0.09

For each indicator, given weights were based on the importance of indicators in sericulture production. The highest weight was given to the control over the use of income indicator 0.20, considered one of the main indicators to achieve empowerment. The weight assigned for indicators of production and leadership domain was 0.10. The weight assigned for indicators of resource and time was 0.06 and 0.09, respectively. The score for IEI was calculated, and three ranges were made based on the score. The frequency of women under each range of IEI has been given in Table 4.

Table 4: Distribution of frequency of women under different ranges of Individual Empowerment Index (IEI)

Sl. No	Range	Number of women	Percentage
1.	0.25-0.50	29	32.22
2.	0.50-0.75	41	45.55
3.	0.75-1 (> 0.75)	20	22.22
Total		90	100

It was depicted from the table that the majority of women (45.55 %) were under the range of 0.50 to 0.75, followed by 32.22 % of women who remained under the range of 0.25 to 0.50 and the remaining 22.22 % of women showed the score of IEI more than 0.75 (0.75 to 1.00). A score of more than 0.75 on the individual empowerment index was considered adequate empowerment. It means a woman with a score of more than 0.75 had access to resources, dominance in decisions regarding family matters, and was able to make decisions in sericultural production. Thus it may be opined that only 22.22 per cent of women could attain adequate empowerment. The remaining 77.78 per cent of women were in the process of attaining empowerment.

The pattern of women empowerment across indicators of 5DE

WEI was assessed with the help of the five Domains of Empowerment (5DE). In this research, several indicators were used to measure the empowerment level of women through the pattern of women's involvement in sericultural activities. The domain-wise empowerment level has been presented in Table 5.

Table 5: Domain Wise Empowerment Index (5DE)

Sl. No	Domain (I_i)	Indicators (I_{ij})	Index (Weighted average)
1	Production (I_1)	Input in productive decisions (I_{11})	0.82
		Autonomy in production decisions (I_{12})	0.32
2	Resource (I_2)	Ownership of assets (I_{21})	0.64
		Purchase, sale or transfer of assets (I_{22})	0.48
3	Income (I_3)	Access to and decision on credit (I_{31})	0.66

		Control over use of income (I_{32})	0.67
4	Leadership (I_4)	Group member (I_{41})	0.78
		Speaking in public (I_{42})	0.26
5	Time (I_5)	workload (I_{51})	0.84
		Leisure (I_{52})	0.35

In the productive domain (I_1), the 'Input in productive decisions indicator' has the second highest empowerment level achieved in the 5DE, accounting for a weighted average of 0.82 scores, and the Autonomy in production decisions indicator achieved a weighted average of 0.32 score. In the production domain, the indicators were related to the decision regarding mulberry cultivation &cocoon production. Women's participation in decision-making is essential for achieving more effectiveness in attaining economically sustainable sericulture production. The freedom towards 'productive decision in sericulture and autonomy in sericulture production' revealed greater empowerment.

In the resource domain (I_2), the index value of the indicator 'ownership of assets' was 0.64, and the index value of the 'purchase, sale or transfer of assets' indicator was 0.48. Resource domain relates to ownership of assets and decisions making power about sericulture production and rearing equipment.

In the income domain (I_3), the score for the 'control over the use of income' indicator was 0.67, and the 'access to and credit decision' indicator achieved a score of 0.66. This indicator concerns a decision regarding the use of income and expenses solely or jointly with a male family partner.

In the leadership domain (I_4), the Group members' indicator revealed a score of 0.78, and the 'speaking in public indicator' showed the least score across the 5DE, i.e., 0.26. The 'Speaking in public' indicator has the least empowerment level score across the different indicators of 5DE. Many women avoid speaking in public because it causes discomfort due to a lack of confidence. While women are more willing to speak face-to-face with the individual personally, they are less willing to speak about public issues like sericultural issues, social issues, and wage rates of the labours.

In the Time domain (I_5), the time domain is related to how much time is allocated to productivity and house works. It also includes satisfaction with the period available for leisure time. The 'workload indicator' has the highest empowerment level, with a score of 0.84, and the 'Leisure indicator' achieved a score of 0.35. Women did the major share of sericulture work. Therefore, women are considered an important asset in profitable sericulture enterprises.

It is witnessed from the table that among all the indicators, the highest percentage of women empowerment was observed in the 'workload' indicator with a weighted average of 0.84 and lowest in the 'speaking in public' indicator weighted average of 0.26. As per discussion, only three indicators had achieved adequate empowerment across the different ten indicators, i.e., 'Workload', 'Input in productive decisions' and 'Group member' indicators, with a score of 0.84, 0.82, and 0.78, respectively.

Group Empowerment Index

The Women Empowerment Index was estimated for women who participated in sericulture production. After the analysis of IEI with indicator-wise empowerment, the 'Group Empowerment Index' was estimated here with the help of IEI and domain with adequate empowerment. A higher score for women's empowerment is preferable because it indicates a greater empowerment level of women through sericulture production. The percentage of women with adequate empowerment score was 0.22; hence, the percentage of women without adequate empowerment score was 0.78. The percentage of a domain that could acquire an adequate empowerment score was 0.6, and the Women Empowerment Index (WEI) was found to be 0.688 for those women who participated in sericulture. Hence, it may be concluded that sericulture provided employment to women and played a prime role in uplifting the socio-economic condition of women and, thus, empowered them.

Women played an important role in sericulture production, which helped them in enhancing the income from sericulture enterprise. Even with all these, women in the society were not considered farmers and were expected to be only homemakers who cooked for the family and looked after them. Hence, this situation might be improved by uplifting the socio-economic condition of women.

As per the study's findings, women's empowerment may be improvised through proper involvement of women by providing Autonomy in production decisions, purchase, sale or transfer of assets, leadership such as speaking in public and spending leisure to

break monotony so as to improve empowerment.

Conclusion

The central theme of the study is to analyze women's empowerment through mulberry silk production, as it is obvious that sericulture is one of the activities where women carry out the majority of work. It is also evident from the results of the study that more than 50 per cent of workers are women in each activity of silk production. With the increasing role of women in agriculture and allied sector, the study pinpointed women empowerment in these sectors. The frequency of women, i.e. IEI falling in the range of more than 0.75 (>0.75), was considered adequately empowered. About 22.22% of women were under a range of IEI > 0.75, which was opined as the women could have attained adequate empowerment, and the remaining 77.78% of women were confined to the process of attaining empowerment. Further, among all the indicators, women were observed to be highly empowered under the 'workload' indicator (0.84), and it was the lowest in the 'speaking in public' indicator (0.26). The Women Empowerment Index (WEI) was found to be 0.688 for women who participated in sericulture. There is further scope to enhance the women empowerment index through improvement in the scores of different indicators under study, such as speaking in public, Autonomy in production decisions and purchase, sale or transfer of assets etc.

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