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Narottam Atree
Department of Agricultural Economics, COA, IGKV, Raipur, Chhattisgarh, India

Rishi Singh
Assistant Director Sericulture, Department of Sericulture, District Administrative Mungeli, Chhattisgarh, India

Vinay Dansena
Department of Floriculture and Landscaping, KDCHRS, Jagdalpur494001, Chhattisgarh, India

Damini Yadav
Department of Floriculture and Landscaping, COA, IGKV, Raipur492012, Chhattisgarh, India

Corresponding Author:
Narottam Atree
Department of Agricultural Economics, COA, IGKV, Raipur, Chhattisgarh, India

Role of tasar sericulture in women's employment and rural livelihood development in Raigarh district, Chhattisgarh

Narottam Atree[1], Rishi Singh[2], Vinay Dansena[3], Damini Yadav[4]

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Abstract
Tasar silk production plays an important role in generating rural employment and supporting the livelihoods of tribal and economically weaker communities in Chhattisgarh. Women's participation is particularly significant in different activities associated with tasar silk production, including tasar cultivation, cocoon collection, reeling and other related occupations. The present study examines women's participation and employment generation in various tasar-related activities in Raigarh district of Chhattisgarh during the period 2011–12 to 2020–21. The study is based on secondary data collected from the Department of Sericulture, Government of Chhattisgarh. Data relating to male and female beneficiaries, total beneficiaries, women's participation percentage and employment days were analysed using descriptive statistical techniques, percentage analysis and year-wise comparisons.
The findings reveal considerable fluctuations in women's participation during the study period. Women's share among total beneficiaries was highest at 53.01% in 2011–12 and lowest at 27.23% in 2014–15. In 2020–21, women constituted 37.91% of the total beneficiaries. The total number of beneficiaries increased from 3,552 in 2011–12 to 3,868 in 2020–21, while employment generation varied considerably, reaching its highest level of 119,487 employment days in 2019–20. The findings indicate that tasar-related activities provide important employment opportunities for women, although their participation has not increased consistently. The study highlights the need for gender-sensitive interventions, skill development, improved access to productive resources and institutional support to strengthen women's involvement in the tasar silk sector.

Keywords: Tasar silk, Women participation, Employment generation, Rural livelihood, Sericulture, Raigarh district

1. Introduction

Sericulture is an important agro-based and labour-intensive rural industry that contributes to employment generation, income enhancement and livelihood security, particularly among rural and tribal communities. India is one of the major silk-producing countries in the world and produces different varieties of silk, including mulberry, tropical tasar, oak tasar, eri and muga. Among these varieties, tasar silk occupies a significant position because of its association with forest-based livelihoods, traditional knowledge and tribal economic activities.

Tasar silk is a natural wild silk obtained primarily from the cocoons of *Antheraea mylitta*, which is reared on host plants such as Arjun (*Terminalia arjuna*), Asan (*Terminalia tomentosa*) and Sal (*Shorea robusta*). Tasar culture involves several interconnected activities, including host plant maintenance, silkworm rearing, cocoon harvesting, cocoon collection, reeling and other post-cocoon operations. These activities create employment opportunities for rural households and contribute to the development of the non-farm rural economy.

Chhattisgarh is an important state for tasar silk production because of its favourable forest resources, tribal population and traditional involvement in forest-based economic activities. The state's rural and tribal communities participate in different stages of tasar silk production. Sericulture activities have considerable potential to provide supplementary income and seasonal employment to households, especially those dependent on agriculture and forest resources.

Women's participation is an essential component of the sericulture industry. Women are involved in several activities, including silkworm rearing, cocoon handling, sorting, spinning, reeling and other processing operations. Their involvement contributes not only to household income but also to women's economic empowerment and participation in rural production systems. However, women's participation may differ across ac

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tivities depending on the nature of work, availability of training, access to productive resources, institutional support and prevailing socio-economic conditions.

Raigarh district of Chhattisgarh has been associated with tasar-related livelihood activities. The Department of Sericulture has implemented various activities to promote tasar production and generate employment among rural beneficiaries. An examination of the number of male and female beneficiaries and the employment days generated over time can provide useful insights into the contribution of the sector to women's employment.

Although the number of beneficiaries indicates the extent of participation, employment days provide an additional measure of the employment opportunities generated through these activities. Therefore, analysing both indicators is important for understanding the contribution of tasar production to rural livelihood development.

Against this background, the present study analyses women's participation and employment generation in various tasar activities in Raigarh district during 2011 [1]–12 to 2020–21. It also examines changes in the participation of women over the study period and identifies areas requiring policy attention for strengthening women's involvement in the tasar silk industry.

2. Objectives of the study

The major objectives of the present study are:

1. To examine the trends in male and female participation in various tasar-related activities in Raigarh district during 2011 [1]–12 to 2020–21.
2. To analyse the percentage share of women among the total beneficiaries involved in tasar silk production.
3. To assess the contribution of different tasar activities, including tasar cultivation, natural cocoon collection, tasar reeling and other related work, to women's participation.
4. To examine the trend in employment days generated through tasar-related activities during the study period.
5. To identify the major implications of the findings for improving women's participation and employment opportunities in the tasar silk sector.

3. Research methodology

3.1 Study area

The present study was conducted in Raigarh district of Chhattisgarh, India. The district has a history of participation in tasar sericulture and related forest-based livelihood activities. Tasar production provides employment opportunities to rural households through cultivation, cocoon collection, reeling and other associated operations. The study focuses on the participation of male and female beneficiaries in these activities.

3.2 Nature and sources of data

The study is based entirely on secondary data. Year-wise information on the number of male and female beneficiaries engaged in different tasar activities, total beneficiaries, women's participation percentage and employment days was obtained from the Department of Sericulture, Government of Chhattisgarh.

The study covers a ten-year period from 2011–12 to 2020–21. The data have been classified into the following categories:

- Tasar cultivation.
- Natural cocoon collection.
- Tasar reeling.
- Employment in various other activities.
- Total male and female beneficiaries.
- Percentage share of women.
- Total employment days generated.

3.3 Analytical techniques

The following statistical techniques were used to analyse the data:

1. Percentage analysis

The percentage of women beneficiaries was calculated using the following formula:

$$WSP = \frac{F}{T} \times 100$$

Where:

- WSP = Women's share percentage
- F = Total female beneficiaries
- T = Total beneficiaries

2. Year-wise comparative analysis

The number of male and female beneficiaries was compared across different years to identify changes in women's participation.

3. Trend analysis

Employment days were examined to identify fluctuations and changes in employment generation during the study period.

4. Descriptive analysis

The highest, lowest and changing trends in women's participation and employment generation were interpreted using tables and percentage comparisons.

3.4 Scope and limitations of the study

The study is restricted to Raigarh district and covers the period 2011 [1]–12 to 2020–21. It examines the number of beneficiaries and employment days rather than individual income, wages, productivity or household-level economic conditions.

Since the study is based on secondary data, its findings depend on the accuracy and consistency of the information provided by the Department of Sericulture. The study also does not establish a direct causal relationship between government schemes and changes in women's participation.

4. Results and Discussion

4.1 Year-wise trends in women's participation in various tasar activities

Women's participation is an important indicator of the inclusiveness of the tasar silk production system. The involvement of women in cultivation, cocoon collection, reeling and other related activities contributes to employment generation and rural livelihood development.

The data presented in Table 1 indicate that women's participation in tasar-related activities in Raigarh district fluctuated considerably during 2011 [1]–12 to 2020–21.

Table 1. Labour Participation and Employment Generation in Various Tasar Activities in Raigarh District (2011–12 to 2020–21) [1]

Year	Total beneficiaries	Male	Female	Women's share (%)	Employment days
2011–12	3,552	1,669	1,883	53.01	53,597
2012–13	3,569	2,006	1,563	43.79	31,444
2013–14	2,771	1,348	1,423	51.35	20,224
2014–15	2,505	1,823	682	27.23	46,125

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Year	Total beneficiaries	Male	Female	Women's share (%)	Employment days
2015–16	3,204	1,694	1,510	47.13	34,028
2016–17	4,245	2,478	1,767	41.63	111,455
2017–18	4,502	2,738	1,764	39.18	115,012
2018–19	3,658	2,114	1,544	42.21	71,152
2019–20	3,444	2,330	1,114	32.35	119,487
2020–21	3,868	2,394	1,474	37.91*	104,513

Source: Department of Sericulture, Government of Chhattisgarh.

Note: The reported women's participation percentage for 2020–21 is 37.91%. However, calculation using the reported female and total beneficiaries (1,474/3,868 × 100) gives 38.11%. This discrepancy requires verification against the original departmental records.

4.1.1 Trends in total beneficiaries

The number of total beneficiaries involved in tasar activities varied throughout the study period. In 2011–12, a total of 3,552 beneficiaries were recorded, which increased slightly to 3,569 in 2012–13. However, the number declined to 2,771 in 2013–14 and further decreased to 2,505 in 2014–15.

A subsequent increase was observed during 2015–16 and 2016–17, when the number of beneficiaries reached 3,204 and 4,245, respectively. The highest participation was recorded in 2017–18, with 4,502 beneficiaries.

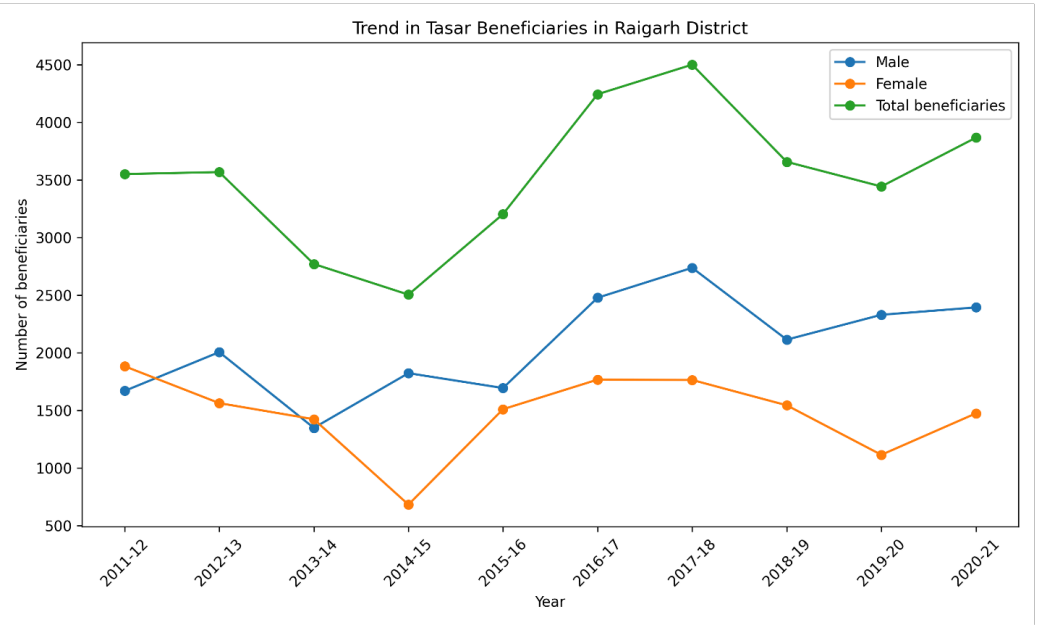


Figure 1. Fig.1 - **Total beneficiaries Male Female in Raigarh district**

After 2017–18, the number of beneficiaries declined to 3,658 in 2018–19 and 3,444 in 2019–20. It again increased to 3,868 in 2020–21.

The overall trend indicates that participation in tasar activities was not uniform. The fluctuations may be associated with changes in programme coverage, availability of employment opportunities, seasonal factors and participation in different sericulture activities. However, further investigation is necessary to identify the specific reasons for these variations.

4.1.2 Women's participation in tasar silk production

Women's participation is an important dimension of employment generation and livelihood development in the tasar silk industry. The data indicate substantial year-to-year variations in the percentage of female beneficiaries.

Women's share among tasar beneficiaries

Table 2. Reported percentage of female beneficiaries in Raigarh, 2011 [1]–12 to 2020–21.

	Women (%)
2011–12	53%
2012–13	43.8%
2013–14	51.4%
2014–15	27.2%
2015–16	47.1%
2016–17	41.6%
2017–18	39.2%
2018–19	42.2%
2019–20	32.4%

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	Women (%)
2020–21	37.9%

In 2011–12, women accounted for 53.01% of the total beneficiaries, indicating that female participation was higher than male participation. The percentage declined to 43.79% in 2012–13, although it increased again to 51.35% in 2013–14.

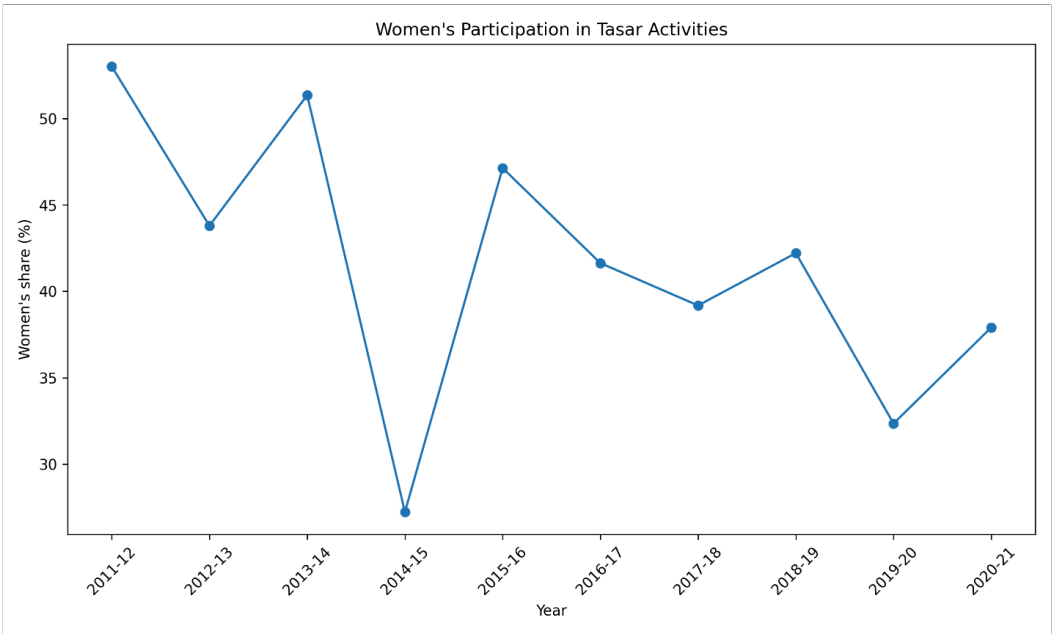


Figure 2. Women Participation in Tasar activities

The lowest level of women's participation was recorded in 2014–15, when women constituted only 27.23% of total beneficiaries. This was followed by a considerable recovery to 47.13% in 2015–16.

During 2016–17 and 2017–18, women's participation declined to 41.63% and 39.18%, respectively. A slight improvement was observed in 2018–19, when the percentage reached 42.21%. However, it declined again to 32.35% in 2019–20 before increasing to the reported 37.91% in 2020–21.

These findings reveal that women's participation remained inconsistent throughout the study period. Although women constituted more than half of the beneficiaries in 2011–12 and 2013–14, their share remained below 50% in the subsequent years. This suggests that the benefits of tasar-related employment were not distributed consistently between male and female beneficiaries.

The decline in women's participation requires attention from the concerned authorities. Special emphasis should be given to women's access to training, improved reeling facilities, institutional support and participation in income-generating activities throughout the tasar value chain.

4.1.3 Activity-wise participation of women

The activity-wise distribution of beneficiaries provides further information about women's involvement in different stages of tasar production.

A. Tasar cultivation

Tasar cultivation accounted for the largest number of beneficiaries throughout the study period. In 2011–12, 3,233 beneficiaries were engaged in tasar cultivation, including 1,564 women. In 2016–17, the total number increased to 3,903, including 1,425 women.

In 2020–21, the number of beneficiaries engaged in cultivation reached 3,430, of whom 1,149 were women. These figures demonstrate that women remained involved in the cultivation component of tasar production throughout the study period.

However, the proportion of women engaged in cultivation varied over time, indicating the need to strengthen their participation through training, technical assistance and improved access to cultivation-related resources.

B. Natural cocoon collection

Natural cocoon collection was recorded in selected years. No beneficiaries were reported under this category during 2011–12 to 2016–17. In 2017–18, a total of 60 beneficiaries were reported, all of whom were male.

In 2019–20, 49 beneficiaries were recorded, including 47 males and two females. In 2020–21, the reported total was 36 beneficiaries, including 36 males and one female, although these sex-wise figures do not add up to the reported total.

The limited recorded participation of women in natural cocoon collection suggests that this activity had a relatively small contribution to the recorded female beneficiary population. It may be useful to investigate whether women have adequate opportunities to participate in this segment of the production chain.

C. Tasar reeling

Tasar reeling represents an important post-cocoon activity in the silk production process. The data indicate that women's participation in reeling was particularly significant.

In 2011–12, all 319 beneficiaries engaged in tasar reeling were women. The same pattern was observed in 2012–13, when 319 women participated in this activity.

In subsequent years, female beneficiaries continued to constitute the majority of participants in reeling. For example, in 2017–18, out of 386 beneficiaries, 270 were women. In 2019–20, all 423 reported beneficiaries were women.

In 2020–21, the reported number of women engaged in tasar reeling was 324 out of 402 beneficiaries, indicating that women continued to play a major role in this activity.

These findings suggest that tasar reeling represents an important area of women's employment in Raigarh district. Strengthening reeling-related skills, improving working conditions and providing access to modern equipment may further improve women's participation and productivity.

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D. Employment in various other activities

Participation in other activities was comparatively limited. In 2013–14, a total of 120 beneficiaries were recorded under this category, including 110 males and 10 females.

No beneficiaries were recorded in this category during most of the remaining years. This indicates that the recorded employment opportunities were concentrated mainly in cultivation and reeling rather than in diversified activities.

Expanding women's participation in additional activities, such as cocoon grading, spinning, processing and value addition, could create further employment opportunities.

4.1.4 Trends in employment generation

Employment days are an important indicator for assessing the extent of work opportunities generated through sericulture activities. Unlike the number of beneficiaries, which indicates the number of individuals participating in the programme, employment days provide information about the volume of employment generated.

Employment days generated in Raigarh district

Table 3. Annual employment days recorded in tasar-related activities, 2011–12 to 2020–21.

Year	Employment days(Silk farmer)
2011–12	53,597
2012–13	31,444
2013–14	20,224
2014–15	46,125
2015–16	34,028
2016–17	1,11,455
2017–18	1,15,012
2018–19	71,152
2019–20	1,19,487
2020–21	1,04,513

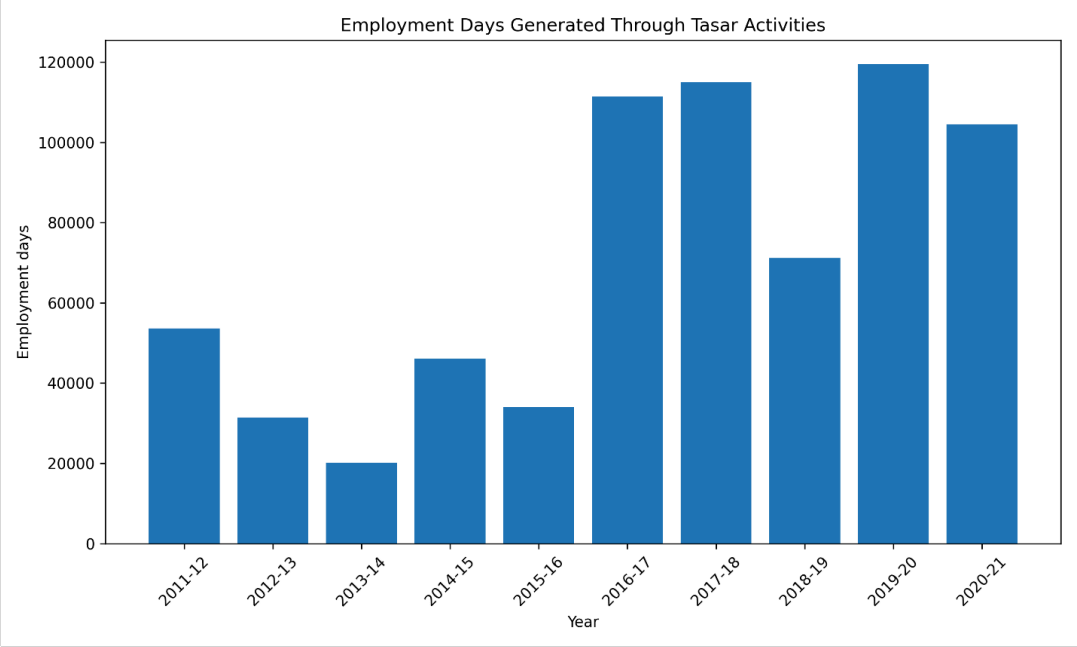


Figure 3. Employment generation days through tasar activities

The employment generation data show considerable fluctuations during the study period. In 2011–12, a total of 53,597 employment days were generated. This figure declined to 31,444 in 2012–13 and further decreased to 20,224 in 2013–14, representing the lowest employment generation during the entire study period.

In 2014–15, employment days increased to 46,125, followed by a decline to 34,028 in 2015–16. A substantial increase was observed in 2016–17, when employment generation reached 111,455 days.

The upward trend continued in 2017–18, with 115,012 employment days. However, employment days declined to 71,152 in 2018–19 before increasing significantly to 119,487 in 2019–20, the highest level recorded during the study period.

In 2020–21, employment generation declined slightly to 104,513 days but remained considerably higher than the levels recorded during the initial years.

A comparison of the initial and final years indicates that employment days increased by approximately 95% between 2011–12 and 2020–21. This suggests an expansion in the volume of employment generated through tasar-related activities over the decade, despite fluctuations in the number of beneficiaries.

The findings also indicate that employment days did not necessarily increase in direct proportion to the number of beneficiaries. For example, in 2017–18, the total number of beneficiaries was 4,502, while in 2019–20 it declined to 3,444. Nevertheless, employment days increased from 115,012 to 119,487 during the same comparison. This suggests that the volume of employment generated may depend on the number of working days available to beneficiaries in addition to the total number of participants.

It is important to note that the data do not provide a gender-wise distribution of employment days. Therefore, the precise number of em

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ployment days generated for women cannot be determined from the available information.

4.1.5 Relationship between women's participation and employment generation

An examination of women's participation alongside employment days provides a broader understanding of the performance of tasar-related activities in Raigarh district.

In 2011–12, women accounted for 53.01% of total beneficiaries, with 53,597 employment days generated. In 2013–14, women's participation increased to 51.35%, although employment generation declined to 20,224 days.

In 2016–17, women's participation was 41.63%, while employment generation increased substantially to 111,455 days. Similarly, in 2019–20, women's participation declined to 32.35%, whereas employment generation reached its highest level of 119,487 days.

These observations indicate that higher overall employment generation did not necessarily correspond with a higher percentage of women beneficiaries. Therefore, an increase in total employment days should not automatically be interpreted as an increase in women's employment opportunities.

This distinction is important from a gender-inclusive development perspective. Future programme assessments should consider not only the number of female beneficiaries but also their actual working days, earnings, occupational roles and access to productive resources.

4.1.6 Major findings of the study

The major findings derived from the analysis are summarised below:

1. Fluctuation in total beneficiaries: The number of beneficiaries varied from 2,505 in 2014–15 to 4,502 in 2017–18, indicating considerable fluctuations in participation.
2. Variation in women's participation: Women's share was highest at 53.01% in 2011 [1]–12 and lowest at 27.23% in 2014–15.
3. Decline in women's share: The reported female participation percentage declined from 53.01% in 2011–12 to 37.91% in 2020–21, although a slight recovery occurred after 2019–20.
4. Significant contribution of tasar reeling: Women constituted a substantial proportion of the beneficiaries engaged in tasar reeling, demonstrating the importance of this activity for female employment.
5. Limited involvement in natural cocoon collection: Female participation in natural cocoon collection was low in the years for which data were available.
6. Increasing employment generation: Employment days increased from 53,597 in 2011 [1]–12 to 104,513 in 2020–21.
7. Highest employment generation: The highest number of employment days, 119,487, was recorded in 2019–20.
8. Need for gender-sensitive interventions: Despite substantial employment generation, the fluctuating share of female beneficiaries indicates the need for additional measures to strengthen women's participation.

5. Policy implications and suggestions

Based on the findings, the following measures are suggested to improve women's participation and employment generation in tasar silk production in Raigarh district:

1. Strengthening women's participation: Special efforts should be made to increase women's involvement in all stages of tasar production, particularly cultivation, cocoon collection and post-cocoon processing.
2. Skill development and technical training: Women beneficiaries should receive regular training in improved silkworm rearing, cocoon handling, reeling, spinning, grading and value addition.
3. Improving access to equipment: Providing affordable and improved reeling equipment can help women improve productivity and working conditions.
4. Promotion of women's self-help groups: Women's self-help groups and producer organisations should be encouraged to participate in cocoon processing, silk production and marketing.
5. Market linkage and value addition: Better market access, collective marketing and training in value-added silk products can help women obtain improved returns from their activities.
6. Diversification of employment: Women should be encouraged to participate in additional activities such as cocoon grading, spinning, yarn processing and finished-product manufacturing.
7. Gender-disaggregated monitoring: The Department of Sericulture should maintain separate records of male and female employment days, income, wages and activity-wise participation to assess the actual benefits received by women.
8. Regular evaluation of programmes: Periodic assessment should be undertaken to identify the reasons for fluctuations in female participation and to develop suitable interventions.

6. Conclusion

The present study examined women's participation and employment generation in various tasar silk production activities in Raigarh district of Chhattisgarh during 2011 [1]–12 to 2020–21. The findings demonstrate that tasar sericulture has played an important role in providing employment opportunities to rural communities, particularly women.

The analysis reveals that women's participation fluctuated considerably during the study period. The highest female participation was recorded in 2011–12 at 53.01%, while the lowest was observed in 2014–15 at 27.23%. Although women's participation improved in certain years, it did not show a consistent upward trend. By 2020–21, women constituted approximately 38% of the total beneficiaries.

The activity-wise analysis indicates that women had a particularly important role in tasar reeling. Their participation in natural cocoon collection and other activities was comparatively limited. This suggests that opportunities exist to diversify women's employment across different stages of the tasar silk production chain.

Employment generation showed a generally increasing trend over the decade, although considerable annual fluctuations were observed. Employment days increased from 53,597 in 2011 [1]–12 to 104,513 in 2020–21, with the highest generation of 119,487 days in 2019–20.

An important finding is that an increase in total employment generation does not necessarily indicate an increase in women's participation. Therefore, future development programmes should focus on both expanding employment opportunities and ensuring equitable participation of women.

Overall, tasar sericulture has considerable potential to strengthen women's economic participation and improve rural livelihoods in Raigarh district. Greater emphasis on skill development, modern technology, institutional support, women's self-help groups and market linkages could contribute to more inclusive and sustainable development of the tasar silk industry.

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