Asian Journal of Agricultural Extension, Economics & Sociology

Volume 41, Issue 8, Page 163-171, 2023; Article no.AJAEES.100031
ISSN: 2320-7027

Study of Gaps in Adoption of Improved Tasar Silkworm (*Antheraea mylitta D*) Rearing Technologies

Pravin C. Gedam [a++*], D. M. Bawaskar [b++], B. N. Chowdhary [c#], A. Venugopal [c†] and A. D. Ingale [a‡]

[a] Basic Seed Multiplication and Training Centre, Central Silk Board, Bhandara, Maharashtra-441 924, India.
[b] Basic Seed Multiplication and Training Centre, Central Silk Board, Balaghat, Madhya Pradesh-481 001, India.
[c] Basic Tasar Silkworm Seed Organization, Central Silk Board, Bilaspur, Chhatisgarh-495 112, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2023/v41i81992

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/100031

Original Research Article

Received: 21/03/2023
Accepted: 25/05/2023
Published: 08/06/2023

ABSTRACT

Maharashtra contributes paltry 0.76 per cent of the total production of tasar silk in the country, with 23 MT but the production of tasar silk in the state is found to be dwindling which might be due to the gaps in knowledge and adoption of improved tasar silkworm rearing technologies. Therefore,

[++] Scientist-C;
[#] Scientist-D;
[†] Director;
[‡] Field Assistant;
**Corresponding author: E-mail: pravin2823@gmail.com;*

present investigation was undertaken to assess the gaps in adoption of tasar silkworm rearing technologies and constraints faced by the tasar farmers in adopting the recommended technologies. The study was conducted in Bhandara, Gondia and Gadchiroli districts of Maharashtra. The "Ex-post facto" research design was used for the study. A total 120 tasar silkworm rearing farmers were randomly selected for the study from those selected districts. The data was analyzed using SPSS software. The results showed that the major gaps in adoption were seen the practices such as Integrated Pest Management for the control of gall disease (91.67%), application of Farm Yard Manure (FYM) or vermi-compost @4 kg/plant or 2kg/plans twice in a year (87.50%) and foliar spraying of 1.5% urea twice @ 15 days' interval before 30 days of rearing (78.33%) and these were ranked 1st, 2nd and 3rd, respectively. The average gaps in adoption were 52.71 per cent. Similarly, non-availability of quality seeds/Dfls for rearing, non availability of disease resistance/tolerant silkworm races, non-enhancement of seed cocoon/reelable cocoon prices due to non-availability of formal and fair market, no hand holding support during the crop failure from the government, outbreak of diseases due to weather fluctuation and difficulty in adoption of recommended package of practices due to insufficient fund were the major constraints experienced by the tasar silkworm rearers. Thus, proper research, extension, communication and training strategies are needed to be formulated so that the constraints faced in adoption will be removed and the gaps in adoption could be bridged in order to accelerate the rate of adoption of modern tasar silkworm technologies in state and, thus, increasing the scope for boosting the tasar silk production of the state in the years to come.

Keywords: Adoption gaps; knowledge; sericulture; tasar silkworm; constraints.

1. INTRODUCTION

Sericulture is an art and science of rearing of silkworm for the production of raw silk and the other byproducts. It is one of the most important sectors of Indian economy and plays a vital role in poverty alleviation. It requires low investment and it helps to earn higher returns in short gestation period, so the farmers are getting attracted to this sector and it is best tool to improve the rural economy as well as to improve their living standards [1].

India occupies a unique position in the world as it is the only country in the world which produces all the four distinct varieties of silks namely Mulberry, Eri, Tasar and Muga [2]. In India, about 15 states are engaged in production of non-mulberry silk. Among the non-mulberry silk, tasar silk is the second major non-mulberry silk produced in India. Today, Tasar sericulture plays a vital role and became an integral part of tribal's livelihood, practiced by over 1.5 lakh tribal population in 9 states of India, including Maharashtra.

In Maharashtra, very few sections of the society are well acquainted with tasar and mulberry silk production. In Maharashtra about 22 districts are involved in sericulture of which 18 districts are engaged in mulberry sericulture. However, the tasar sericulture is majorly being practiced in the four districts of eastern Vidarbha; Gondia, Gadchiroli, Chandrapur and Bhandara from last 300 years [3,4]. The tasar food plantation is available in17766 hectares area in the state [5]; however its full utilization for the tasar culture is yet to be realized. Around 2757 families mainly belong to Dheewar community are practicing tasar sericulture in those four districts of the state. Maharashtra contributes paltry 0.76 per cent of the total production in the country, with 23.0 MT [6], however the production trend in the state depicts that the production is dwindling over the period. The state has potential to achieve an annual production of 50 MT but the same is not achieved till date. The Indian sericulture industry as a whole and Maharashtra in particular is currently facing the problems of stagnation in production, low productivity and poor quality of produce, due to many reasons like knowledge practice gap, lag in communication and faulty rearing techniques [7]. This might be due to the non-adoption of recommended package of practices of tasar silkworm rearing technologies recommended by the institute by the tasar silkworm rearers. The tasar silkworm rearing farmers might be facing constraints in the adoption of those recommended package of practices. Keeping this in view, the present investigation was conducted to identify the gaps in adoption and constraints faced by the tasar silkworm rearers in the state. Also to assess the suggestion offered by the tasar rearers and stakeholders in overcoming those constraints so as to boost the production of tasar silk in the state. Thus, the study was

carried out with the objectives to study the gaps in adoption of improved tasar silkworm rearing technologies and to identify the constraints in adoption and suggestions offered by the farmers.

2. METHODOLOGY

The "Ex post facto" research design was used for the present investigation. The present study was conducted in Bhandara, Gondia and Gadchiroli districts of Maharashtra state. From each district one tehsil was purposively selected for the study where tasar silkworms rearing are extensively carried out by the Tasar silkworm rearers. Three tehsils selected were Pavni, Arjuni and Armori, from Bhandara, Gondia and Gadchiroli districts, respectively. From Each tehsil two villages and from each village 20 tasar silkworm rearing farmers were selected randomly to make a total sample size of 120 respondents. Pre-testing of the questionnaire was made on pilot basis and suitable changes were incorporated within the formation of things, questions and their sequences. The level of knowledge scale formulated by Jha and Singh [8] and Sengupta [9] was used with due itemized modifications. Knowledge and adoption gap index for improved Tasar silkworm rearing technology in the study area was calculated by using the formulae of [10];

$$I_{kag} = [P_{(ka)} - A_{(ka)} / P_{(ka)}] \times 100$$

Where:

I_{kag} is Knowledge and Adoption gaps,
$P_{(Ka)}$ is knowledge and Adoption potential (ka) and
$A_{(ka)}$ is Actual knowledge and Adoption

For measuring the constraints in adoption of the improved tasar silkworm rearing technologies, the constraints were first broadly divided into: input constraints, technical constraints, marketing constraints, organizational or institutional constraints, environmental constraints and personal constraints. Garrett's ranking techniques was adopted to analyze the constraints faced by tasar silk. The respondents were asked to rank the given factors that were limiting the tasar silkworm rearing and production in the area. The order of merit thus given by the respondents was converted into ranks using the following formula;

$$Percent\ position = \frac{100(Rij - 0.5)}{Nj}$$

Where;

R_{ij} = Rank given for i^{th} factor by j^{th} individual and
N_j = Number of factors ranked by j^{th} individual.

Data were collected and statistical tools such as frequency distribution, percentages and averages were employed for analysis. All the analysis was carried out using Microsoft Windows Excel and SPSS Version 22.0.

3. RESULTS AND DISCUSSION

3.1 Knowledge and Adoption Gap Index

As far as the knowledge of the tasar silkworm rearing practices is concerned, from the result presented in Table 1, it can be inferred that the knowledge possessed by the tasar silkworm rearers of Maharashtra was in the range of 76 to 100 per cent with average knowledge percentage of 89.17 per cent.

Also, from the data presented in the Table 1 about the adoption and adoption gap in recommended tasar silkworm rearing technologies, it is found that the majority of the respondents reported to have maximum adoption gap in Integrated Pest Management for the control of gall disease (91.67%) followed by application of Farm Yard Manure (FYM) or vermi-compost @4 kg/plant or 2kg/plans twice in a year (87.50%) and foliar spraying of 1.5% urea twice @ 15 days' interval before 30 days of rearing (78.33%) and these were ranked 1st, 2nd and 3rd, respectively.

The reasons cited by the respondents for not adopting the recommended technologies were; un-availability of sufficient fund to purchase the chemicals and health hazards of the chemical used and non-availability of chemical with local input dealers, FYM is naturally available due to grazing of cattle in forest and high cost of fertilizer and unavailability of sufficient fund to purchase the chemicals fertilizer respectively. Khushwah and Singhvi [11] in their study reported that monetary consideration was one of the main reasons for partial adoption of practice of chemical fertilizer application.

Table 1. Knowledge and adoption gaps of tasar silkworm rearers of Maharashtra

(n=120)

Rearing Practices	Existing knowledge		Existing adoption		Adoption gap	Rank	Reasons for Non- adoption
	f	%	*f*	%	%		
Timely pruning and pollarding of the host plants	102	85.00	89	74.17	25.83	IX	Labor intensive work. Forest department not allow pruning or pollarding the trees.
Integrated Pest Management for the control of gall disease	92	76.67	10	8.33	91.67	I	No sufficient fund to purchase the chemicals. Health hazards of the chemical use.
Incubation of the Egg/dfls in earthen pot	110	87.50	99	82.50	17.50	X	Dfls received at time of rearing
Disinfection of rearing field before and after the rearing conducted	104	86.66	46	38.33	61.67	VI	High cost of the chemicals required for disinfections
Using of nylon nets for Chawki rearing of Tasarsilk worms	110	91.67	30	25.00	75.00	IV	Use of nylon net cause disease outbreak. Non availability of net with local dealers.
Application of FYM or vermi-compost @4 kg/plant or 2kg/plans twice in a year	98	81.67	15	12.50	87.50	II	FYM is naturally available due to grazing of cattle in forest
Foliar spraying of 1.5% urea twice @15 days' interval before 30 days of rearing	91	75.83	26	21.67	78.33	III	High cost of the fertilizers. Results are not visible.
Spraying of Sodium Hypochlorite solution@0.01% as per recommendation as per larval stages of silkworm	112	93.33	43	35.83	64.17	V	Non availability of chemical with local input dealers and No sufficient fund to purchase the chemicals.
Larval stage wise spraying of Jeevan Sudha as per recommendation of CTR&TI, Ranchi	118	98.33	53	44.17	55.83	VII	Non-availability of Jeevan Sudha with local input dealers
Dusting of Lime and Bleaching during the rainy season to reduce humidity	115	95.83	56	46.67	53.33	VIII	No sufficient fund to purchase the chemicals.
Attending timely transfer of the larvae to the host plants to avoid starvation of worms	120	100.0	105	87.50	12.50	XI	Lack of labors during peak of the rearing
Harvesting of cocoons after 8 days of the spinning	120	100.0	109	90.83	09.17	XII	Spoiling of seed cocoons by the rat and squirrels
Average		89.37		47.29	52.71		

Author's calculation, 2022

Using of nylon nets for chawki rearing of tasar silkworms and Spraying of Sodium Hypochlorite solution@0.01% as per recommendation according to larval stages of silkworm were ranked 4th and 5th with the respective gaps percentage of 75.00 and 64.17. The reasons given for non adoption were; use of nylon net cause disease outbreak and non availability of net with local dealers and non-availability of chemical with local input dealers and no sufficient fund available to purchase the chemicals. Less adoption gap was reported in harvesting of cocoons after 8 days of the spinning, attending timely transfer of the larvae to

the host plants to avoid starvation of worms and incubation of the Eggs/Dfls in earthen pot with the ranks of 12th, 11th and 10th, respectively. This might be due to the reason that it doesn't required monetary expenses. The findings of the study resonate with the findings of Gupta et al. [12], Hugar et al. [13], Jalba [1] and BAIF [14] and Haribaruah et al. [15].

3.2 Constraints in Adoption of Improved Tasar Silkworm Rearing Technologies

The constraints in adoption of the improved tasar silkworm rearing technologies were broadly divided into input constraints, technical constraints, marketing constraints, organizational or institutional constraints, environmental constraints and personal constraints. They are elaborated individually in Table 2.

3.2.1 Input constraints

From the perusal of the Table 2 it can be inferred that the major constraints in tasar silk production were non-availability of quality seeds/Dfls for rearing (Means Score = 59.050) followed by un-timely supply of seeds or Dfls for rearing (Mean Score = 52.525) and high cost of chemical fertilizer required for the maintenance of Tasar host plants with the mean score of 51.041.

3.2.2 Technical constraints

The major technical constrains faced by the tasar silkworm rearers of the Maharashtra were non-availability of disease resistance/tolerant races (Mean Score = 58.866) with rank of 1st followed by high incidence pests/predators and diseases during rearing (Mean Score = 54.233) and difficulty in pest/predator and disease management of tasar silkworm (Mean Score = 50.441). The findings of the study are tuned with the finding notified by Jalba [1], BAIF [14] and Gogoi et al [16]. Moreover, Shiva Kumar G. and Shamitha G. [17] in their studies also reported that 80 to 90 per cent crop loss occurs due to pests, predators, natural calamities and diseases.

3.2.3 Marketing constraints

Marketing is the most important factor, which influences the development of sericulture in any country. As far as the marketing constraints are concerned, Non-enhancement of Seed cocoon/reelable cocoon prices due to non-availability of formal and fair market, fluctuation in cocoon prices when purchased by private traders and forced/distress sale during non-availability of buyers/traders were ranked Ist, IInd and IIIrd, respectively by the tasar silkworm rearers of Maharashtra with the mean score of 57.766, 54.350 and 51.108, respectively. The findings of the study are in line with [16].

3.2.4 Organization and institutional constraints

From the perusal of the Table 2 it can be seen that no hand holding support during the crop failure from the government, non-availability of crop insurance during crop failure and weak sericulture extension linkages mechanism were the major constraints denoted by the tasar silkworm rearers of Maharashtra with their respective ranking of Ist, IInd and IIIrd while the training and research facilities are not up to the mark was ranked last. The findings of the study are in tuned with the findings of Jalba [1] and Hugar et al. [13] and BAIF [14].

3.2.5 Environmental constraints

As far as the environment constrains are concerned, the majority of tasar silkworm rearers have given **o**utbreak of diseases due to weather fluctuation 1st rank followed by erratic and unseasonal rainfall during the rearing leads to crop failure with 2nd rank and changing climatic conditions such as temperature and humidity leads to high pest and predator attack with 3rd rank while fluctuating weather conditions poses high risk of crop loss. Declining quality of forest viz-a-vis host plants due to climate change and declining quality of forest viz-a-vis host plants due to climate change were ranked 4th, 5th and 6th respectively.

3.2.6 Personal constraints

As far as the personal constraints are concerned, the data presented in the Table 2 shows that the difficulty in adoption of recommended package of practices due to insufficient fund was the major constraints expressed by the tasar silkworm rearers with mean score of 63.283 (ranked 1st) followed by not capable of investment without subsidy of state government and non-availability of working capital due to low income with the mean score of 57.591 (ranked 2nd) and 51.591 (ranked 3rd) respectively. Low risk taking capacity of the rearers was ranked as 4th major constraint while lack of entrepreneurship among the rearers and young generation is not interested in taking up the activity were 5th and 6th major constraints, respectively.

Table 2. Constraints faced in adoption of improved tasar silkworm rearing technologies

A	Input Constraints	Overall (n=120)	
		MS*	Rank
1	Non-availability of quality seeds/Dfls for rearing	59.050	I
2	Un-timely supply of seeds or Dfls for rearing	52.525	II
3	High cost of chemical fertilizer required for the maintenance of Tasar host plants	51.041	III
4	High cost of chemicals required for the disinfection of field	48.308	IV
5	High labour cost and non availability of labour on time	46.983	V
6	Non-availability of the inputs with local Krishi Kendra	45.816	VI
B	**Technical Constraints**	**MS**	**Rank**
1	Non availability of disease resistance/tolerant races	58.866	I
2	High incidence pests/predators and diseases during rearing	54.233	II
3	Difficult in pest/predator and disease management of tasar silkworm	50.441	III
4	Lack of knowledge on disinfection and disinfectant	48.683	IV
5	Poor adoption of scientific rearing practices	46.658	V
6	Technology backwardness	45.083	VI
C	**Marketing Constraints**	**MS**	**Rank**
1	Non-enhancement of Seed cocoon/reelable cocoon prices due to non-availability of formal and fair market	57.766	I
2	Fluctuation in cocoon prices when purchased by private traders	54.350	II
3	Forced/Distress sale during non-availability of buyers/traders	51.108	III
4	Delay in payment by the buyers or traders	48.941	IV
5	Poor information on market and buyers available	46.858	V
6	Partial purchase of cocoons by government agencies leads	44.275	VI
D	**Organizational or institutional constraints**	**MS**	**Rank**
1	No hand holding support during the crop failure from the government	59.450	I
2	Non-availability of crop insurance during crop failure	54.316	II
3	Weak Sericulture Extension linkages mechanism	51.066	III
4	Complete dependence on the Department of Sericulture for the input supply	48.941	IV
5	Lack of infrastructure and equipments for ensuring the compliance of rearing practices	46.725	V
6	Training and Research facilities are not up to the mark	43.841	VI
E	**Environmental constraints**	**MS**	**Rank**
1	Outbreak of diseases due to weather fluctuation	60.941	I
2	Erratic and unseasonal rainfall during the rearing leads to crop failure	56.175	II
3	Changing climatic conditions such as temperature and humidity leads to high pest and predator attack	51.283	III
4	Fluctuating weather conditions poses high risk of crop loss	47.725	IV
5	Declining quality of forest viz-a-vis host plants due to climate change	45.525	V
6	Declining quality of forest viz-a-vis host plants due to climate change	43.741	VI
F	**Personal constraints**	**MS**	**Rank**
1	Difficulty in adoption of recommended package of practices due to insufficient fund	63.283	I
2	Not capable of investment without subsidy of state government	57.591	II
3	Non availability of working capital due to low income	51.808	III
4	Low risk taking capacity of the rearers	48.258	IV
5	Lack of entrepreneurship among the rearers	44.125	V
6	Young generation is not interested in taking up the activity	40.525	VI

**MS-mean score*

Table 3. Suggestions offered by tasar silkworm rearers/stakeholders for improving the tasar silk production in the state

(N = 120)

Sl. No.	Suggestions offered by the Tasar rearers/stakeholders	Mean Score	Rank
1	Utmost 90% subsidy should be given towards the Seed/Dlfs cost to the tasar rearers by the state government	58.67	I
2	Timely and quality dfls should be supplied to the tasar rearers at their door step	57.50	II
3	Price towards the seed cocoons/reelable cocoons need to be enhanced every year and should be paid on time by the government/traders	53.17	III
4	Hand holding support should be given by the government during the crop failure	51.83	IV
5	Like the other agricultural crops, crop insurance should be given to the tasar rearers during crop failure	50.50	V
6	Inputs such as urea, lime and bleaching and other important chemicals disinfectants for disinfections should be provided by the state government with subsidies rate	49.17	VI
7	Establishment of region wise training and research centers for the demonstration of technologies	48.33	VII
8	Climate tolerant tasar silkworm races should be developed by the research institutes	47.67	VIII
9	Massive plantation drive of quality planting saplings of Asan and Arjun should be done in forest areas	46.67	IX
10	Nucleus and basic seed cocoons rearing should be incentivized to increase the production	45.67	X
11	Crop loans should be provided to the tasarrearers on the line of agricultural crops	44.33	XI
12	Sericulture Extension linkages mechanism should be strengthen	43.33	XII
13	Mechanization of all sericulture activities is to be done to cut down the labor cost	41.83	XIII
14	Low cost organic fertilizers preparation techniques should be demonstrated to the tasar silkworm rearers	40.83	XIV
15	Hazardous effects of climate change should be made aware to the tasar silkworm rearers	39.67	XV

Author's calculation

3.3 Suggestions Offered by Tasar Silkworm Rearers/Stakeholders

The suggestions offered by the tasar silkworm rearers/stakeholders of Maharashtra for boosting the production of tasar silk in the state is presented in the Table 3 which shows that the majority of the stakeholders have suggested that utmost 90 per cent subsidy should be given towards the Seed/Dlfs cost to the tasar rearers by the state government with the mean score of 58.67 and it was ranked 1st followed by timely and quality dfls should be supplied to the tasar rearers at their door step (Mean Score =57.50) and price towards the seed cocoons/reelable cocoons need to be enhanced every year and should be paid on time by the government/traders (Mean Score =53.17). Other important suggestion offered by the stakeholders were hand holding support should be given by the government during the crop failure (Mean Score=51.83), like the other agricultural crops, crop insurance should be given to the tasar rearers during crop failure (Mean Score = 50.50) and inputs such as urea, lime and bleaching and other important chemicals disinfectants for disinfections should be provided by the state government with subsidies rate (Mean Score=49.17) and were ranked 4th, 5th and 6th respectively. Similarly, establishment of region wise training and research centers for the demonstration of technologies (Mean Score = 48.33), climate tolerant tasar silkworm races should be developed by the research institutes (Mean Score = 47.67) and massive plantation

drive of quality planting saplings of Asan and Arjun should be done in forest areas (Mean Score = 46.67) suggestions were ranked as 7th, 8th, and 9th respectively by the tasar silkworm rearers/stake holders. The other moderately important suggestion given by the stakeholders were, Nucleus and basic seed cocoons rearing should be incentivized to increase the production (ranked 10th with Mean Score =45.67), crop loans should be provided to the tasar rearers on the line of agricultural crops (ranked 11th with Mean Score =44.33), sericulture Extension linkages mechanism should be strengthen (ranked 12th with Mean Score =43.33). Mechanization of all sericulture activities is to be done to cut down the labor cost (Mean Score =41.83), low cost organic fertilizers preparation techniques should be demonstrated to the tasar silkworm rearers (Mean Score = 40.83) and hazardous effects of climate change should be made aware to the tasar silkworm rearers (Mean Score =39.67) were the least important suggestion offered by the stakeholder with the rank of 13th, 14th and 15th respectively. The suggestion offered by the stake holders are in line with the study of Jalba [1] and Hugar et al. [13] and BAIF [14].

4. CONCLUSION

The study clearly indicates that there are gaps in knowledge and adoption of improved tasar silkworm rearing technologies recommended by the research institute such as; Integrated Pest Management for the control of gall disease, application of FYM or vermi-compost @4 kg/plant or 2kg/plans twice in a year and foliar spraying of 1.5% urea twice @15 days' interval before 30 days of rearing and using of nylon nets for Chawki rearing of Tasar silkworms etc. The decline in the tasar silk production in the state is might be due to the non adoption of those improved tasar silkworm rearing technologies and the constraints faced by the tasar silkworm rearers such as non-availability of quality seeds/Dfls for rearing, non-availability of disease resistance/tolerant races of tasar silkworm, non-enhancement of seed cocoon/reelable cocoon prices due to non-availability of formal and fair market, no hand holding support during the crop failure from the government, outbreak of diseases due to weather fluctuation, non-availability of working capital due to low income. Non-compliance with standard or recommended tasar silkworm rearing practices is the primary reasons for the inability of enterprise to realize its potential in the state. Declining forest covers, urbanization and mining activities are the major threats towards loss of tasar habitats especially for the local and unique race of Bhandara local. Poor pricing policy of the seeds as well as commercial cocoons in the state, results in de-motivation and cause to lose the interest in the enterprise by the tasar silkworm rearers. It also leads to trading of cocoon to the neighboring states where higher rates prevail, thus, affecting raw material availability for post-cocoon operations. It is essential to extend incentives on different activities such as 90 per cent subsidy should be given towards the Seed/Dlfs cost, like the other agricultural crops, crop insurance should be given to the tasar silkworm rearers during crop failure and crop loans should be provided to the tasar silkworm rearers on the line of agricultural crops etc. It is a serious need to formulate the best extension and communication strategies to take across the modern tasar silkworm technologies to increase the rate of adoption of recommended technologies. Moreover, the best trainings and research centers in the state should also be established to provide the best technological support to the local masses so as to generate the low cost technologies and inculcate those technologies among the sericulturists and extension staff by upgrading their skills. With the best research, extension & communication and training strategies, the constraints faced by the farmers could be removed so as to accelerate rate of adoption of modern tasar silkworm rearing technologies in state and, thus, increase the scope for boosting the tasar silk in the state. The silk industry in Maharashtra will surely take a big leap in years to come if such vital issues, which requires proper attention from the sericulture research and development sector to reduce yield gap at farmer's level and to make sericulture a profitable enterprise in the state. Sericulture will sustain automatically if productivity per disease free laying (DFL) is increased and this can only happen, if existing constraints are removed or at least lowered down.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ACKNOWELEDGEMENT

The authors are grateful to the Director, BTSSO, Bilaspur for providing the permission as well as the valuable input for the said research paper.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Jalba HC. Scenario of sericulture industry in Maharashtra State, Indian Journal of Entomology and Zoology Studies. 2016: 4(1):601-605.
2. Kumaresan P. Quality Silk Production: Some economic issues. Economic and Political Weekly. 2002;4019-4022.
3. Mathur SK, Thorat SY, Rathore GN, Kamdi NG. Tasar culture in Maharashtra. Indian Silk. 2000;36(5):16-18.
4. Jadhav AD, Sathe TV, Dubal R. Status of sericulture in Maharashtra –A Study. Proceeding, 22nd Congress of International Sericulture Commission Organized by International Sericultural Commission France and Queen Sirikit Dept. of Sericulture, Thailand. 2011;271-283.
5. Directorate of Sericulture, Govt. of Maharashtra, Nagpur Annual Reports. Mahasilk.maharashtra.gov.in 14-15.
6. Annual Report. Central Silk Board, Bangalore; 2020. Available:www.csb.gov.in/
7. Sahaf KA, Bhat SA, Ahmad MA. Sericulture in North West India with special reference to temperate region-Problems and prospects. Proceedings of National Seminar on “Sericulture Development in Temperate Region-Problems & Prospects” Srinagar J&K. 2016:21-25.
8. Jha PN, Singh KN. A test to measure farmer's knowledge about high yielding variety programme, Inter-discipline. 1970; 7(1):65-67.
9. Sengupta TA. Simple adoption scale for farmers for high yielding varieties of paddy. Indian Journal of Extension Education. 1967;3:107–115.
10. Pushpa, Srivastava SK. Yield gap analysis and the determinants of yield gap in major crops in eastern region of Uttar Pradesh. Economic Affairs. 2014;59(4): 653-662.
11. Kushwaha RV, Singhvi NR. Extent of adoption of improved sericultural practices by the sericulturists of Buldhana district of Maharashtra. Agric. Update. 2013;8(3): 469-471.
12. Gupta VP, Birbal Munda , Gangwar, SK, Hansda G, Prakash, NBV. Impact of socio-economic factors on knowledge and adoption of tasar culture technologies by farmers. Indian Journal of Sericulture. 2011:50(2):147-153.
13. Hugar II, Sathyanarayana K, Pande AB. Revitalization of tribal economy through sustainable tasar culture in Maharashtra. International Journal of Science and Research. 2016:5(2):1963-1967
14. BAIF, Tasar Value Chain Analysis – Maharashtra (MKSP) project under Mahila Kisan Sashaktikaran Pariyojana (MKSP)-NTFP for the ‘Promotion of Large Scale Tasar Sericulture-based Livelihoods in the state of Maharashtra; 2017.
15. Hatibaruah D, Dutta LC, Saikia H. Adoption behaviour of sericulture farmers regarding improved technologies of Jorhat District of Assam. Indian Journal of Extension Education. 2022:58(1): 26-30.
16. Gogoi R, Gogoi G, Saud RK, Bhuyan N, Barthakur AK, Neog M, Pathak PKA. Study on constraints of ericulture in dhemaji district of Assam. Indian Journal of Extension Education. 2023:59(1):66-169.
17. Shiva Kumar G, Shamitha G. Studies on larval mortality: Diseases, pest and predator menace in outdoor and indoor reared tasar silkworm, *Antheraea mylitta Drury* (Daba TV). Research Journal of Animal, Veterinary and Fishery Sciences. 2013;1(4):1-7.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/100031