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Spatio-temporal analysis of Sericulture Concentration Development in North Western Himalayan Region of Kashmir Valley, India: A District level Analysis.

Análisis espacio-temporal del desarrollo de la concentración de la sericultura en la región noroccidental del Himalaya del valle de Cachemira, India: un análisis a nivel de distrito.

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ABSTRACT.

Sericulture is an allied agricultural sector that includes the agroforestry cottage industry, which is crucial to providing people in the Kashmir valley with sustainable livelihoods and regional development. Backward and forward linking activities include growing mulberry plantations, breeding silkworms to manufacture silk cocoons, coiling cocoons to untie silk filament, yarn production, weaving, and processing silk textiles. The purpose of the present study is to emphasise the Spatio-temporal trends, concentration, and distribution of sericulture in the Kashmir valley from 2005-2006 to 2019-2020 in terms of mulberry plants and silk cocoons. To achieve the study's goal of determining trends at the district level and the concentration of sericulture development in Kashmir Valley, the compound annual growth rate, linear regression analysis, and evaluation index method were utilised. According to the Perusal of Results, the trend of silk cocoon production and yield increased at rates of 3.77 and 10.70 from 2005-2006 to 2019-2020, whereas the mulberry area showed signals of decreasing at a rate of -5.97 over the last 15 years (2005-2020). The findings show that the concentration of sericulture is maximum in northern and southern parts of Kashmir valley includes Baramulla, Anantnag, Kupwara, and

minimum in central parts of Kashmir. The spatial distribution of sericulture concentration in Kashmir's districts has been visualised using Arc GIS 10.4, with the goal of identifying places for sericulture development in the valley. As a result, efficient government sericulture policy initiatives and an integrated strategic approach are vital not only in terms of prospective revenue-generating activities, but also in terms of the J&K economy's GDP. The Kashmir Valley silk arts and craftsmanship reflect the region's rich cultural heritage and contribute considerably to the development of new artistic trends within the Union of Jammu and Kashmir.

Keywords: Mulberry plantations, Silk cocoons, Kashmir valley, Districts, Spatio-temporal analysis.

RESUMEN

La sericultura es un sector agrícola aliado que incluye la industria artesanal agroforestal, que es crucial para proporcionar a las personas del valle de Cachemira medios de vida sostenibles y desarrollo regional. Las actividades de vinculación hacia atrás y hacia adelante incluyen el cultivo de plantaciones de moreras, la cría de gusanos de seda para fabricar capullos de seda, el enrollado de capullos para desatar el filamento de seda, la producción de hilo, el tejido y el procesamiento de textiles de seda. El propósito del presente estudio es enfatizar las tendencias espacio-temporales, la concentración y la distribución de la sericultura en el valle de Cachemira desde 2005-2006 hasta 2019-2020 en términos de plantas de morera y capullos de seda. Para lograr el objetivo del estudio de determinar las tendencias a nivel de distrito y la concentración del desarrollo de la sericultura en el valle de Cachemira, se utilizaron la tasa de crecimiento anual compuesta, el análisis de regresión lineal y el método del índice de evaluación. Según el análisis de resultados, la tendencia de la producción y el rendimiento de capullos de seda aumentó a tasas de 3,77 y 10,70 desde 2005-2006 hasta 2019-2020, mientras que el área de morera mostró señales de disminución a una tasa de -5,97 en los últimos 15 años. (2005-2020). Los hallazgos muestran que la concentración de sericultura es máxima en las partes norte y sur del valle de Cachemira, que incluye Baramulla, Anantnag, Kupwara, y mínima en las partes centrales de Cachemira. La distribución espacial de la concentración de la sericultura en los distritos de Cachemira se ha visualizado utilizando Arc GIS 10.4, con el objetivo de identificar lugares para el desarrollo de la sericultura en el valle. Como resultado, las iniciativas gubernamentales eficientes de políticas de sericultura y un enfoque estratégico integrado son vitales no solo en términos de posibles actividades generadoras de ingresos, sino también en términos del PIB de la economía de J&K. Las artes y la artesanía de la seda del valle de Cachemira reflejan el rico patrimonio cultural de la región y contribuyen considerablemente al desarrollo de nuevas tendencias artísticas dentro de la Unión de Jammu y Cachemira.

Palabras clave: plantaciones de moreras, capullos de seda, valle de Cachemira, distritos, análisis espacio-temporal.

INTRODUCTION

The natural environment plays a pivotal role in the sericulture development of Kashmir valley. Sericulture is the practise of cultivating silk-producing organisms and is derived from the Greek words sericos, which means silk, and culture, which means nurturing. Silkworm rearing, reeling, and weaving are all multi-sectoral processes in this sustainable agro-based economy. (Kumaresan 2008; Barcelos et al 2020). A mulberry crop is the foundation of sericulture, and it is directly responsible for the production of silk cocoons. As a result, mulberry farming, also known as moriculture, is an important aspect of sericulture. It involves the cultivation of mulberry plantations and silkworms rearing which is based on agricultural labour from which silk yarns are obtained (Roopa et al 2015). In Kashmir valley silkworm rearing takes place during spring and autumn seasons which generates work for farm families (Kamili et al 2000; Ganaie et al 2018).Mulberry silk is produced by silkworm (Bombyx mori). The Silkworm feeds on mulberry leaves and spins a silk cocoon in about 28-30 days. Finally, the reelers buy the silk cocoons and turn them into silk yarn. J&K's bivoltine silk is of high quality, providing livelihood opportunities in the pre-cocoon and post-cocoon sectors, and has enormous potential due to its agro-climatic conditions, which could be converted into a silkworm gene bank for the world's sericulture, and contributes to the sustainable development of the region (Tazima 1978). Kashmir is known for its carpet silk business all over the world. It currently produces 805 metric tonnes of Silk cocoon per year and employs 7,000 people. Around 22,000 farmers are directly or indirectly employed by the sector (Anonymous, 2020).

China ranks first in the world in terms of silk production, contributing 142,005 MT each year (Anonymous 2016-17). Sericulture is a profitable industry with high employment potential that contributes to poverty alleviation and sustainable development goals in many areas of Africa, South Asia, and South America (Barcelos etal 2021). It improves women's empowerment and gender equality and is considered a lucrative industry with high employment potential. (Giacomin etal 2017; Purusottam et al 2015; Wang etal 2010; Popescu 2018). Sericulture currently plays an increasing role in the consumption of silk products in developed countries, resulting in high demand in the global market and an important role in foreign exchange earnings for developing countries around the world, resulting in the transformation from the sericulture sector to the manufacturing sector (Astudillo et al 2015; Armito etal 2014) China is the world's largest producer of silk, followed by India, Uzbekistan, Thailand, and Brazil. (Babu 2019; Long et al 2006; Anonymous 2017).

Compound annual growth model was used to evaluate mulberry and silk cocoon generation in India from 1971-72 to 2008-09 (Manjunath, et al 2015; Anonymous 2011). The Central Silk Board of India launched Silk Samagra to improve sericulture across India, including Jammu and Kashmir (J&K), with the goal of improving the quality and efficiency of silk (Anonymous 2019a). No comprehensive study has been conducted on the development of sericulture in Kashmir valley regions between 2005 to 2020. Taking the foregoing into account, this study performs a research study on sericulture expansion and concentration in ten districts of Kashmir valley, which is critical in terms of prospective income-generating activities and farmers' long-term livelihood. Kashmir's silk business has risen to prominence on Europe's silk route, with which Kashmir began its silk trade and exports silkworm seeds to Europe (Anonymous 2013). During 2018-19, Jammu and Kashmir produced roughly 801 MT of cocoons, with income generated from pre-cocoon and post-cocoon/yarn production (Anonymous 2020a). Srinagar city has been recently awarded a UNESCO World Heritage Site designation for its dynamic crafts and rich cultural ethos, both of which contribute to the city's long-term urban development in line with the UN Sustainable Development Goals. The majority of persons working with mulberry silk have income-generating prospects because to the establishment of silk weaving units in Rajabagh and Solina, Srinagar (Anonymous 2021).

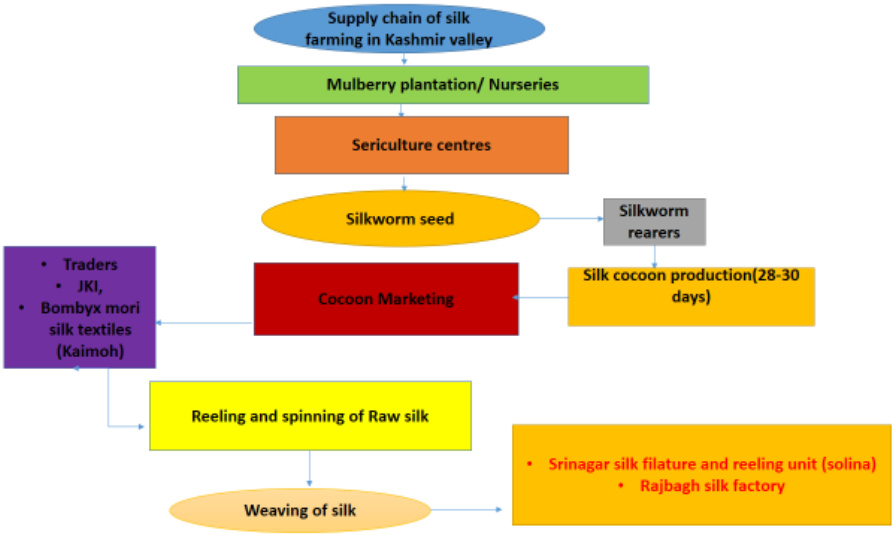

Fig 1: Silk farming process in Kashmir valley (Prepared by researcher)

MATERIAL AND METHODS

The Location of Research area: The Kashmir valley is a transverse valley and meso-geographical region in India's north-western corner, wedged between the Pir Panjal and Greater Himalayan ranges at a height of 1580 metres above mean sea level in the union territory of Jammu and Kashmir. The weather in Kashmir valley is seasonal and has a temperate climate. The temperature varies from 10°C in winter to 39°C in summer with a yearly precipitation of approximately 75cm (Shafiq et al 2018). Mulberry cultivation and

silkworm rearing are both affected by the weather. Climate plays an important role in mulberry cultivation and silkworm rearing. Any variation in temperature, rainfall, or humidity conditions may affect the cultivation of mulberry plants or the rearing of silk cocoons at different harvesting seasons. Mulberry plant prefers mild temperature, generally not exceeding 26°C. It thrives well in temperate, tropical as well as subtropical conditions. The projected entire population of Jammu and Kashmir union territory is 1.53 crore, according to census 2021. Agriculture and its related activities, such as sericulture, animal husbandry, and apiculture, employ over 70% of the population. Industrial Policy was adopted in J&K under the Twelfth Five-Year Plan (2012-17), which concentrates on silk textile industries, handloom and handicraft sectors, Khadi and village industries, and fosters green economy and eco-friendly enterprises.

Sericulture plays a critical role in the Kashmir valley's subsistence options, which are typically landless and marginal according to the World Bank's 2021 income classification. The Himalayan topography of Kashmir Valley is socioeconomically suitable to sericulture growth and development, allowing rearers to achieve silk farming sustainability.

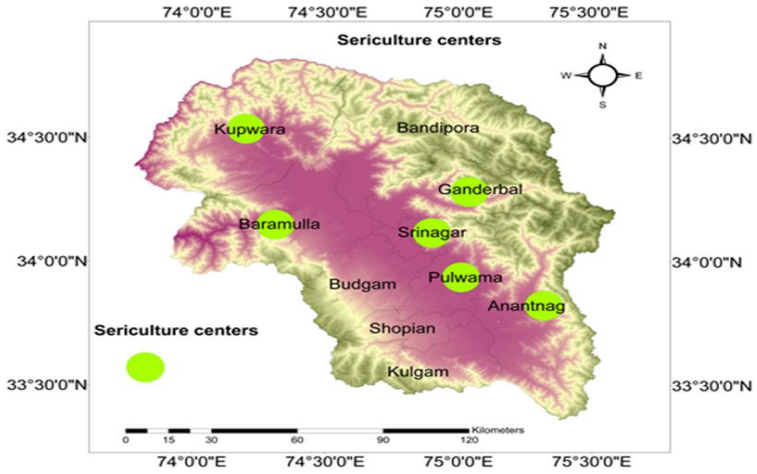

Fig 2: Sericulture centres of Kashmir valley (Prepared by author with ArcGIS 10.4 software).

Data base and methodology: The data for the proposed study was gathered from both primary and secondary sources. Observational research and focus groups with sericulture rearers are among the key data sources. Secondary information was gathered from a variety of sources, including the Directorate of Sericulture Kashmir, the Central Sericultural Research and Training Institute Pampore, the Directorate of Economics and Statistics, Jammu and Kashmir, and FAO reports. The current study used time-series data from 2005-2006 to 2019-2020 on the mulberry area, production, and productivity of silk cocoon in Kashmir valley. In addition, a series of 334 questionnaires were also created to

extract the perspectives of sericulture rearers, taking into account farmers, experts ranging from sericulture assistants to extension educators, scientists, and other necessary requirements. We gathered information at the grassroots level, and respondent were divided into two groups: progressive rearers (2 ounces silkworm seed ounces) and marginal rearers (1 silkworm seed ounces).

Compound annual growth rate

Compound annual growth rates were calculated using logarithmic-linear functions on the temporal series on the area under mulberry, production and productivity of silk cocoons are computed using the exponential growth function. The function pattern used is

$Y = ab^t$

$\text{Log } Y = \log a + t \log b$

$CGR = (\text{Antilog } b-1) \times 100$

Where, CGR = Compound growth rate

t = Time period in year Y =Area/ production / productivity

a & b =Regression parameters.

The strength of association between the dependent and independent variables was determined using a statistical model known as the linear regression model, which was used to discover patterns and comprehend the relationship between variables. The acreage of the mulberry plant, as well as the production and productivity of silk cocoons, were all considered in the analysis. Linear regression models the relationship between the dependent variable (Y) is acreage, production and productivity and the Independent variable (X) is the time period (years). The best model was chosen among the appropriate models based on their goodness of fit R^2 and the relevance of the coefficients.

Evaluation index method: From 2005-2006 to 2019-2020, an evaluation index model was constructed for the concentration of mulberry plantation and silk cocoons in each district. The purpose of this study was to assess 10 districts in Kashmir valley in terms of sericulture belt spatial concentration, which comprises mulberry plant area in hectares, silk cocoon output and productivity in metric tonnes. The evaluation index approach was used to rank socio-economic variables in Jammu and Kashmir on the basis of regional differences (Yousuf et al 2014). Its goal is to find weighted locations based on an evaluation index for sericulture concentration, which improves the region's economic viability. The average index value for each district in Kashmir valley was calculated by adding the individual values for mulberry and silk cocoon concentration. The fixed average value for district selection was 50 or more than 50. The districts of the Sericulture belt in Kashmir valley that scored above 50 were deemed to have high economic viability and

sericulture concentration belt. The following formula was used to calculate an evaluation index technique for mulberry plant and silk cocoon concentration.

$$E.I = \frac{A-B}{C} \times 10+50$$

Where

A = Mean of a particular district B= overall mean

C= Standard deviation 10 = standard unit

50 = fixed value.

RESULTS AND DISCUSSION

In this study, the growth in the area of mulberry, production and productivity of silk cocoons were estimated using compound growth rate as discussed in the methodology part. Kashmir is one of India's most prominent silk cocoon-producing union territories. When compared to the mulberry area, the output and productivity of Kashmir silk cocoons showed a rising linear trend. In Kashmir valley, the mulberry area has been dropping, from 481 hectares in 2005-2006 to 191 hectares in 2019-2020. In 2005-2006, Kashmir produced 194 metric tonnes of silk cocoons, which increased to 338 metric tonnes in 2019-20. Table 1 shows that from 2005 to 2006, the area under mulberry plantation grew at an annual compound growth rate of − 5.97 percent, indicating a decelerating trend and negative growth rate. From 2005-2006 to 2019-2020, the annual compound growth rate of silk cocoon production and productivity was 3.77 percent and 10.7 percent, respectively, demonstrating a positive growth rate.

The growth of the mulberry area in all districts of Kashmir valley was negative whereas the highest decline trend was observed in Bandipora (-10.6 %) followed by Ganderbal (-9.70%), Srinagar (-8.56%), Baramulla (-7.86%), Shopian (-7.55%), Kupwara (-7.06%), Budgam (-6.58%), Kulgam (-3.78%), Anantnag (-3.40%) Pulwama (-2.90%). As far as growth in production and productivity of silk cocoons in districts of Kashmir valley was found to be positive. The highest compound annual growth rate of production of silk cocoons was observed in Kulgam (5.71%) followed by Baramulla (5.46%), Srinagar (4.21%), Ganderbal (3.99%), Pulwama (3.73%), Bandipora (3.60%), Kupwara (3.50%), Shopian (3.33%), Budgam (3.18%), and Anantnag (2.29%). The compound annual growth rate in productivity of silk cocoons was found highest in Baramulla and Ganderbal contributes 14.5 percent followed by Bandipora (13.6%), Srinagar (13.5%), Shopian (11.5%) Kulgam (9.50%) Budgam (9.40%), Kupwara (8.50%), Pulwama (6.70%), and Anantnag (5.80%).

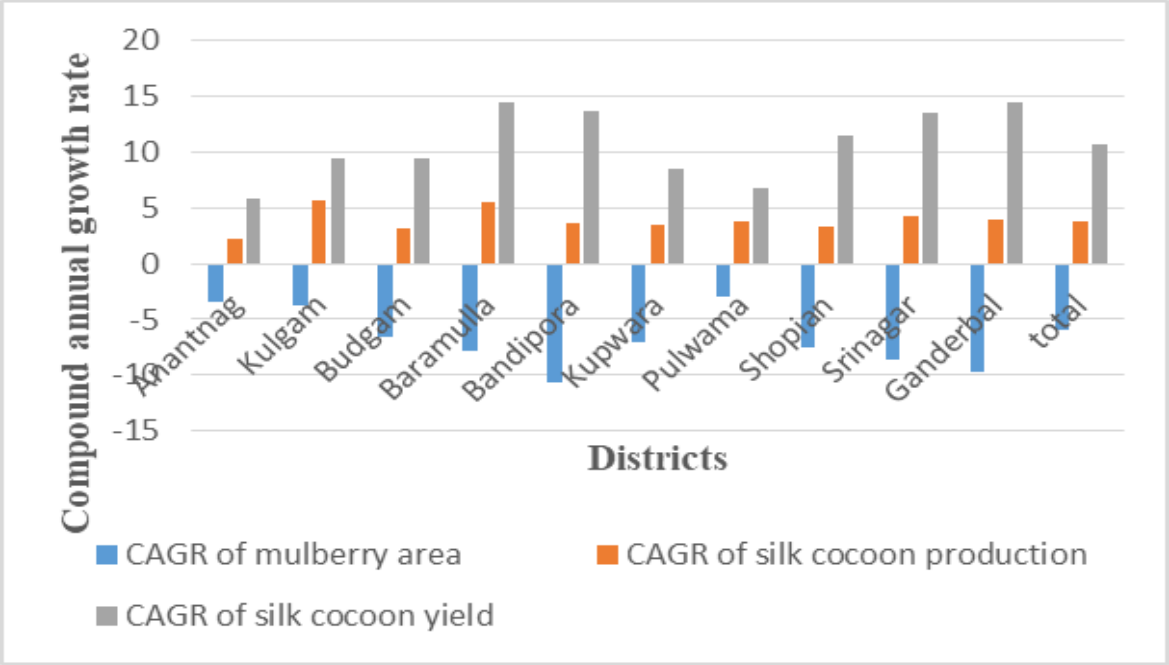

Fig 3: CAGR of area under mulberry plant, production and productivity of silk cocoons in districts of Kashmir valley (2005-2020).

Table 1: District wise annual compound growth rate for Mulberry plant and silk cocoons in Kashmir valley with respect to area of mulberry, production and productivity of silk cocoons from 2005-2006 to 2019-2020.

	2005 -2006 to 2019 -2020		
Districts	CAGR (Area)	CAGR (Production)	CAGR(Productivity)
Anantnag	-3.40	2.29	5.80
Kulgam	-3.78	5.71	9.50
Budgam	-6.58	3.18	9.40
Baramulla	-7.86	5.46	14.5
Bandipora	-10.6	3.60	13.6
Kupwara	-7.06	3.50	8.50
Pulwama	-2.90	3.73	6.70
Shopian	-7.55	3.33	11.5
Srinagar	-8.56	4.21	13.5
Ganderbal	-9.70	3.99	14.5
Total	-5.97	3.77	10.7

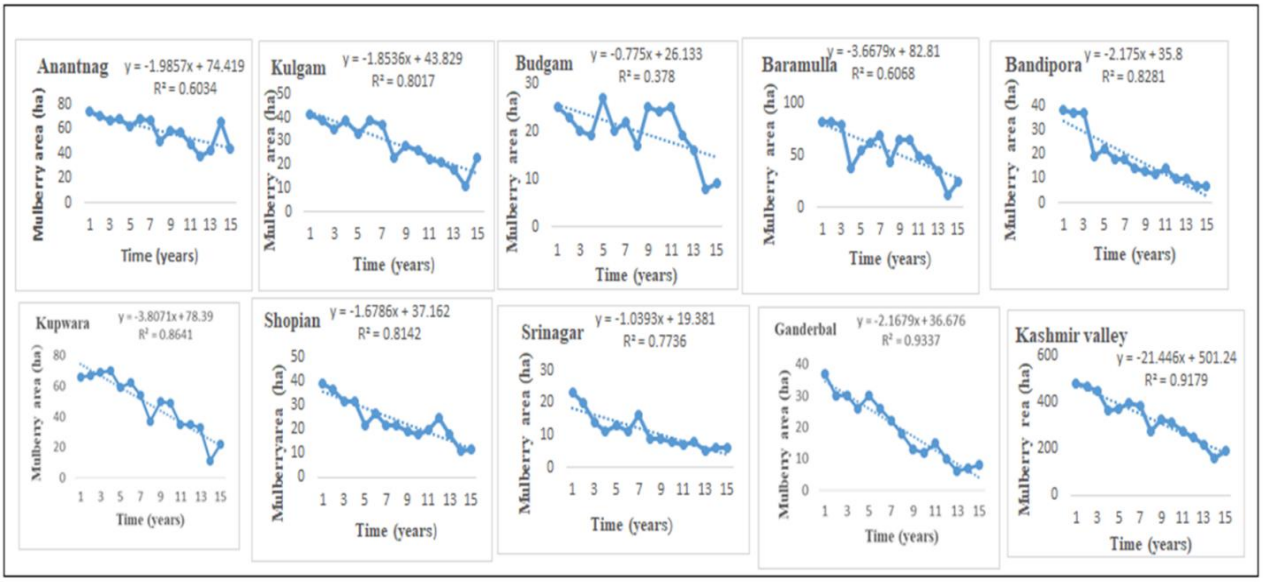

Fig 4: Regression analysis of area under mulberry plant cultivation in districts of Kashmir from 2005 -2020 in hectares

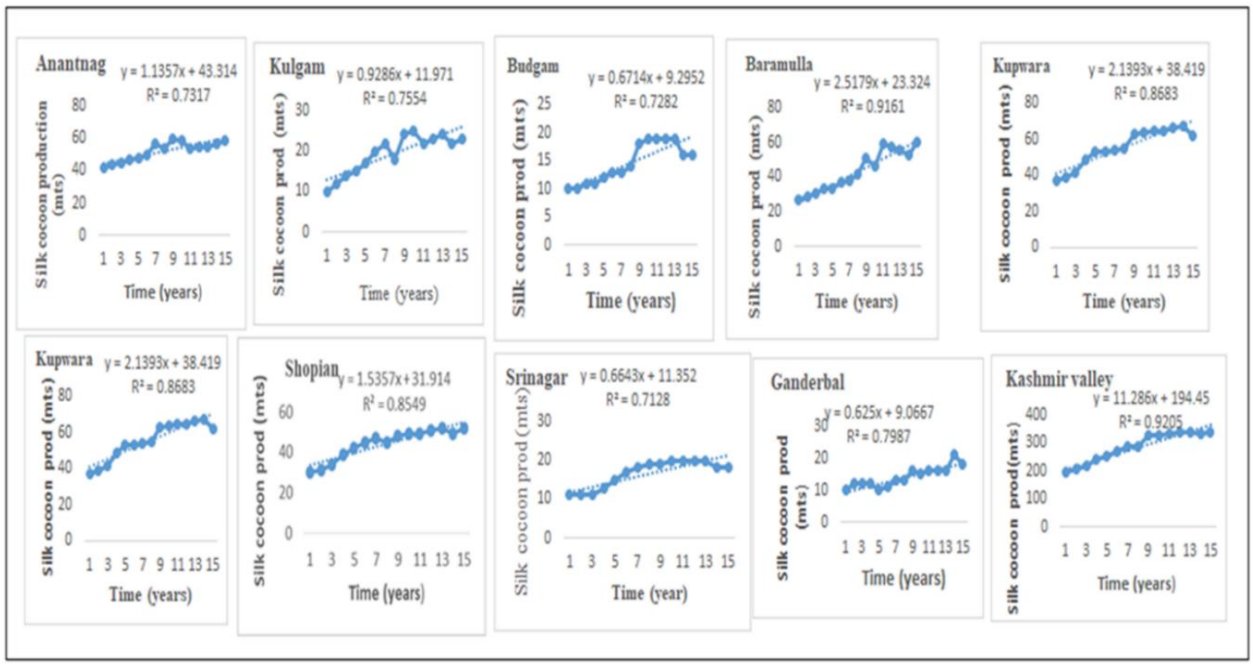

Fig 5: Regression analysis of silk cocoons production from 2005 to 2020 in Districts of Kashmir valley (metric tonnes)

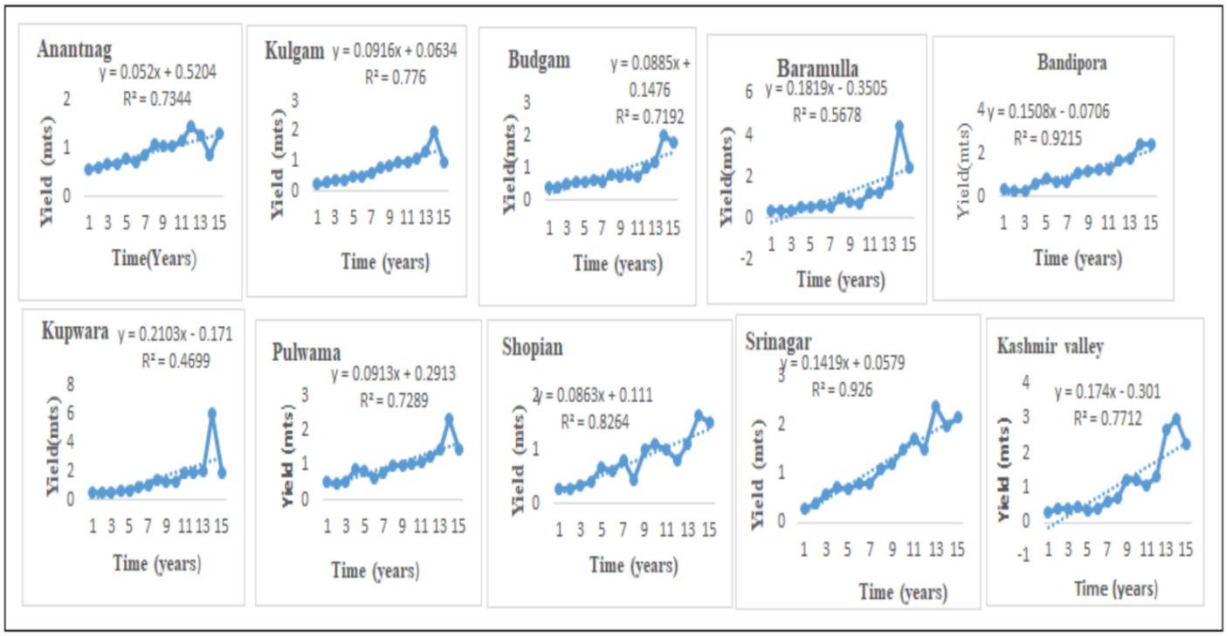

Fig 6: Regression analysis of silk cocoons productivity from 2005 to 2020 (metric tonnes) in districts Kashmir valley.

Table 2: Evaluation index of area under Mulberry in districts of Kashmir valley (2005 - 2006 to 2019-2020)

Districts	Mean	Standard Deviation	Eval. Index of Mulberry area	Ranking
Anantnag	58.5	11.43	64.4	1
Kulgam	29.0	9.25	47.7	6
Budgam	19.9	5.64	42.4	7
Baramulla	53.4	21.05	61.8	2
Bandipora	18.4	10.69	41.5	9
Kupwara	47.9	18.32	58.8	3
Pulwama	48.2	12.95	58.6	4
Shopian	23.7	8.32	49.4	5
Srinagar	11.0	5.28	37.3	10
Ganderbal	19.3	10.03	42.1	8

The evaluation index of the area under mulberry plant varies from 64.4 to 37.3 in the Kashmir valley, as indicated in table 2.According to the evaluation index, the highest spatial concentration of mulberry area is found in Anantnag (64.4), followed by Baramulla (61.8), Kupwara (58.8), Pulwama (58.6), Shopian (49.7), Kulgam (47.7), Ganderbal

(42.1), Bandipora (41.5), Srinagar (37.3), and the lowest concentration is found in the central part of the Kashmir valley, including Srinagar. The concentration and distribution of mulberry plantations are depicted in fig 6.

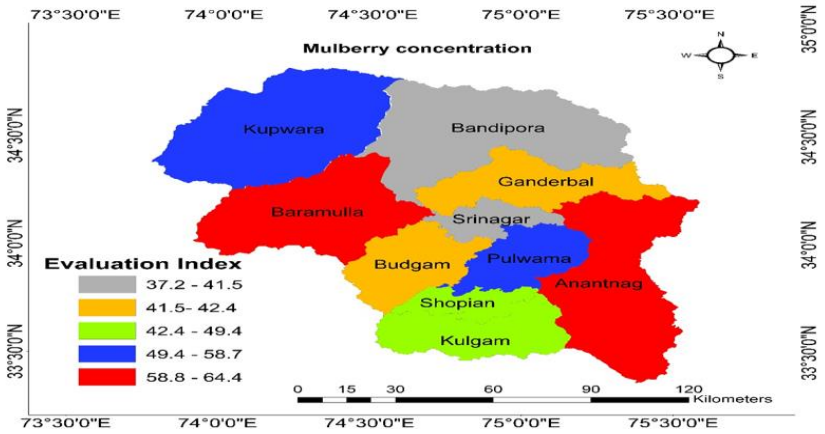

Fig 7: Spatial concentration of mulberry plantation in Kashmir valley from 2005-2020.

Table 3: Evaluation index of Silk cocoons production in districts of Kashmir valley (2005 - 2006 to 2019-2020).

Dist.	Mean	S.D	E.I of silk cocoons production	Ranking
Anantnag	52.4	5.94	63.25	2
Kulgam	19.4	4.78	45.00	5
Budgam	14.6	3.51	42.36	7
Baramulla	43.4	11.76	64.98	1
Bandipora	14.2	3.02	42.10	8
Kupwara	55.5	10.27	58.7	3
Pulwama	44.2	7.43	55.27	4
Shopian	16.6	10.13	43.47	6
Srinagar	10.13	1.96	39.84	10
Ganderbal	14.0	3.13	42.05	9

Baramulla (64.98) has the highest concentration of silk cocoon production, followed Anantnag (63.25), Kupwara (58.7), Pulwama (55.27), Kulgam (45.00), Shopian (43.47), Budgam (42.36), Bandipora (42.05), Ganderbal (42.10), and Srinagar (39.84). The images are particularly useful for displaying sericulture producing belts in the Kashmir valley, as seen in Figure 7.

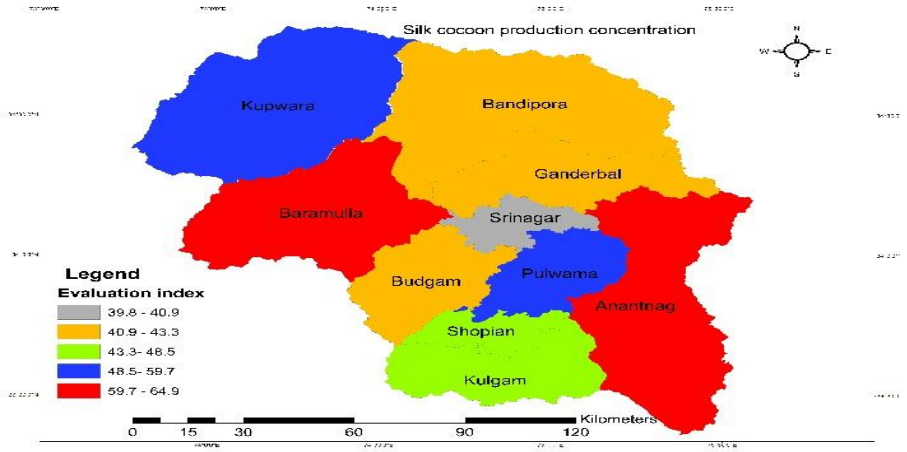

Fig 8: Spatial concentration of silk cocoon production in Kashmir valley from 2005-2020

Table 4: Evaluation index of silk cocoons productivity in districts of Kashmir valley (2005 -2006 to 2019-2020).

Dist.	Average	S.D	E.I of silk cocoons productivity	Ranking
Anantnag	0.93	0.271	56.96	3
Kulgam	0.79	0.464	38.66	10
Budgam	0.85	0.466	41.38	8
Baramulla	1.10	1.07	52.85	4
Bandipora	1.13	0.702	69.96	2
Kupwara	1.51	1.021	71.61	1
Pulwama	1.02	0.470	49.03	6
Shopian	0.80	0.424	38.89	9
Srinagar	1.19	0.659	45.11	7
Ganderbal	1.09	0.886	52.25	5

Kupwara district, located in the northern part of the Kashmir valley, contributes the most silk cocoons productivity (71.61), followed by Baramulla (69.96), Anantnag (56.96), Pulwama (52.85), Shopian (52.25), Kulgam (49.03), Bandipora (45.11), Budgam (41.38), Ganderbal (38.89), and Srinagar (38.66), as shown in fig 8.

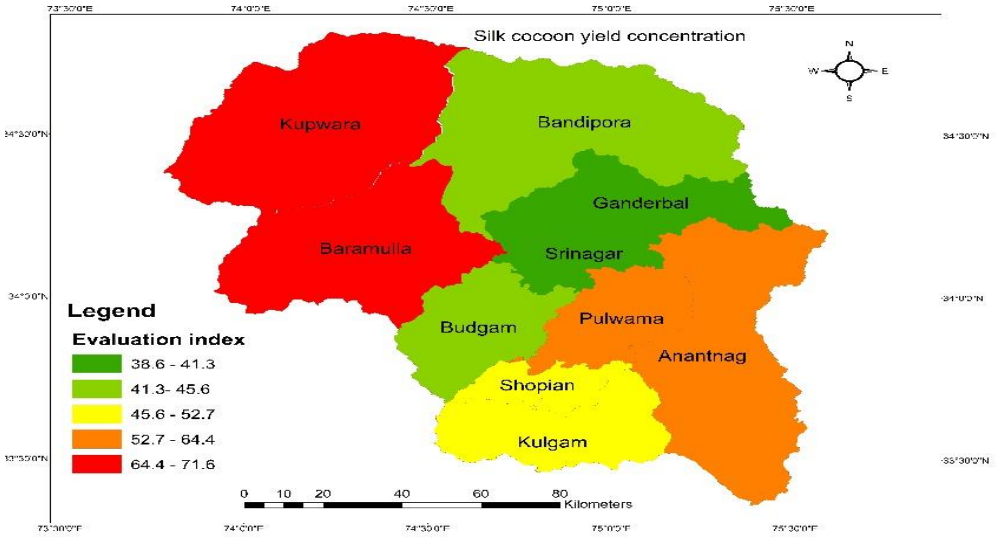

Fig 9: Spatial concentration of silk cocoon productivity in Kashmir valley from 2005-2020

Sericulture rearers' perspectives in the Kashmir valley: It has been perceived that if the silkworm rearers are provided with the necessary infrastructure equipment, there is enormous potential for sericulture to grow and develop. The central silk council programs set up over the last decade in 2011 provide rearing sheds and equipment to rearers which plays an important role in enhancing silk cocoon production. Around 20% of rearers are being provided with rearing sheds and types of equipment which motivates them to get involved in silk farming enthusiastically. However, if more sheds are provided to rearers there is a tremendous potential for sericulture to grow in the Kashmir valley.

The majority of sericulture rearers do not have adequate infrastructure and inputs such as such as mountages, rearing kits, and sheds, cutting boards, etc. For this purpose, proper rearing sheds are equally important for the growth of sericulture in Kashmir valley. Nearly 58 percent of rearers are provided with the free distribution of hybrid silkworm seeds due to which the production rate of silk cocoon production gets enhanced and there is a need to grow more and more mulberry plants which play an important role as far as ecological balance is concerned. The farmers from the study area are chopped the mulberry leaves and to fed the silkworms to produce silk cocoons.

In Kashmir valley, the maximum mulberry plantation was organized in six sericulture centres which is depicted in fig 2. Around 18 percent of sericulture rearers are involved in family farming. Family farming is a convenient and optimum way to increase the output and productivity of silk cocoons so we should increase the percentage of family farming as far as possible to ensure sustainability in sericulture. About 4 percent of rearers considered other factors like socioeconomic and other technological components responsible for involvement in silk farming which are shown in fig 10.

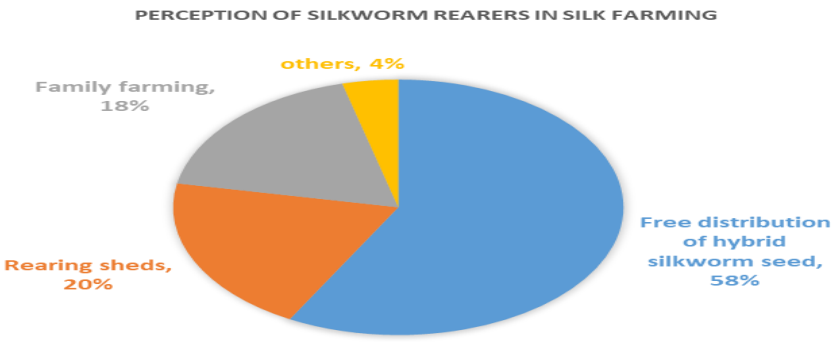

Fig 10. Pie diagrams depicting perception of Silkworm rearers involved in sericulture in Kashmir valley.

Fig 11: Mulberry plantation, Silkworms feed on chopped mulberry leaves, family farming, rearing sheds, Silk cocoons in living room, silk cocoon trays, Reeled mulberry silk. (Source: Field survey 2021-22).

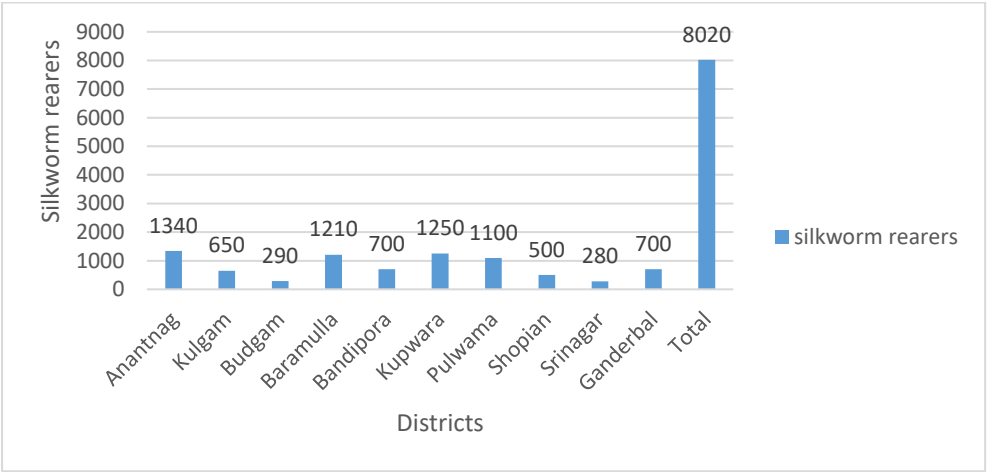

Fig 12: Silkworm Rearers in Districts of Kashmir valley (Source; Directorate of sericulture, Srinagar 2020).

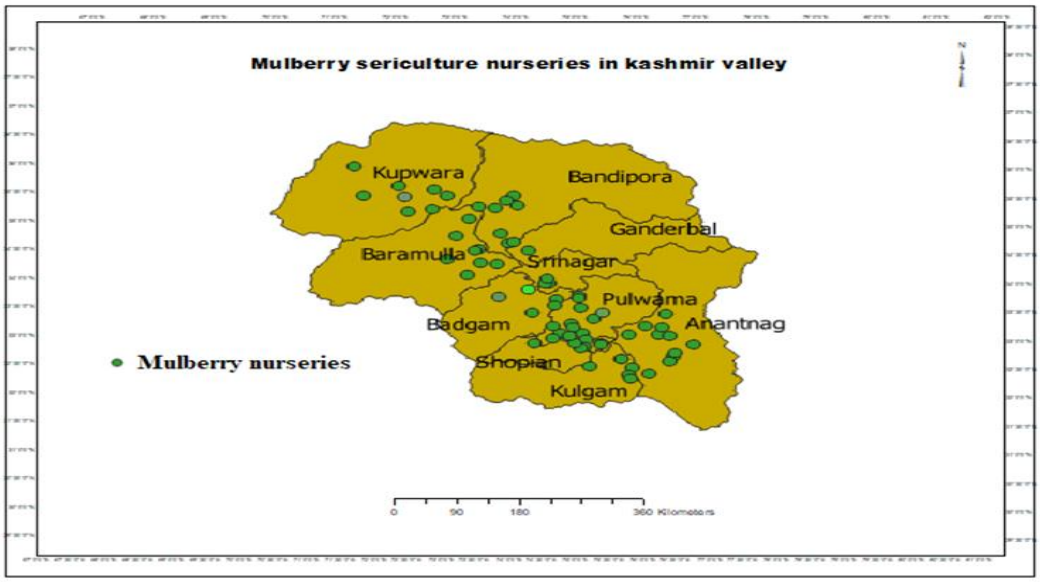

Fig 13: Mulberry Nurseries in Kashmir valley (Prepared by researcher with QGIS) (Source: Directorate of sericulture, Srinagar, J&K).

Sericulture, which is labour intensive, absorbs a large portion of the marginal farmers of underutilised labour in rural areas of Kashmir valley. It also provides an assured income to a substantial section of the marginal farmers of the union territory of Jammu and Kashmir. The growing trend of silk cocoon production and productivity in the Kashmir valley is due to high yielding varieties of mulberry, silkworm bivoltine hybrids, rearing sheds and breeding kits, effective management and implementation of training schemes and programmes, (Bhat et al.2020; Chauhan et al. 2016; Trag et al. 2011).There is a downward trend in mulberry acreage and a negative growth rate due to poor planting practices. Crops for horticulture and agriculture are under pressure due to farmer's reluctance to grow mulberry trees on their land. For this reason intercropping of mulberry planting with agriculture for sustainable livelihoods is the answer to the scarcity of leaves and to promote sericulture in Kashmir valley (Mir et al 2018). In Kashmir valley, It was observed that the trend of sericulture resource development from 1990-2020 was analysed by decomposition model analysis which explains that silk cocoon production was mainly contributed by yield effect (59.27%) followed by interaction effect (46.10%) and area effect (-5.37%). (Mushtaq et al 2021).

One of the main reasons why farmers are discouraged is the poor marketing of silk cocoons, high incidence of pests and lack of support for extension support to take or continue sericulture activities in Kashmir valley (Chauhan etal 2016; Ganaie et al.2018; Bhat et al. 2020). Nowadays, sericulture is in recovery phase which encourages farmers and stakeholders to become involved in this sector. It leads to the sustainable development of sericulture. (Anonymous, 2021). Sericulture centres are upgrading

departmental nurseries in order to increase the number of mulberry plants and foliar yield. It encourages farmers and stakeholders to experiment with sericulture and multi-cropping. To achieve this, proper incentives have been provided, and a public-private partnership model for silk tourism has been designed. Silk tourism in Kashmir valley supports handicrafts and heritage industries that manufacture a variety of handcraft products such as silk rugs, stoles, and fabrics. This is intended to benefit all stakeholders in the value chain and play a significant role in the study region's socioeconomic growth. (Anonymous, 2020a). Considering the present demand for silk fabrics in the Kashmir valley, it is felt that sericulture in Kashmir has the viability of becoming a profitable sector of Jammu and Kashmir. Therefore Kashmir valley having a temperate climate can utilize the existing potentialities in the field of sericulture and increase its silk production. In nutshell, it could be pointed out that sericulture plays a viable role in Jammu and Kashmir as it brings in additional areas under cultivation, generates more income, provides greater employment opportunities, and helps in the overall inclusive development of the region.

As conclusion, in Kashmir valley districts, the concentration of sericulture development is not evenly distributed. Due to the proximity of market centres near the district, Anantnag, Baramulla, Kupwara, and Pulwama have achieved an encouraging level of sericulture development, which includes training programmes and various schemes related to silk handlooms, silk Samagra, effectively implemented in these sericulture belt creating zones. Through the cultivation of improved types of mulberry trees and hybrid silkworm seeds the advancement of sericulture in the Kashmir valley looks to have a favourable growth rate in the generation and efficiency of silk cocoons. Sericulture in Jammu and Kashmir is also based on the adoption of technology breakthroughs from various sericulture institutes, as well as tree type mulberry plantations that help farmers grow silk cocoon and produce silk thread more efficiently. Farmers should be provided with rearing kits to help them raise their crops according to modern scientific principles and boost their average productivity per ounce of seed. Farmers are discouraged from continuing in sericulture, despite the diminishing area under mulberry due to poor planting practises, insufficient mulberry leaves, and marketing challenges.

Both pre-cocoon and post-cocoon sectors demand a comprehensive and holistic strategy approach, as well as human resource development and effective supply chain management, which should be addressed simultaneously. Sericulture gives livelihood security to several population segments specialised in cultivation, rearing, reeling, and weaving, thanks to its sectoral elements of production. Sericulture contributes to the expansion of the rural economy and the creation of a balanced economic sector in the Kashmir valley in this way. As a result, the union territory of Jammu and Kashmir has been able to enhance its output of silk cocoons and yarn due to the geo-economic feasibility of

sericulture. As a result, the future growth plan should concentrate on the regional expansion of sericulture in economically viable regions.

CONFLICT OF INTEREST

The present research was conducted by the authors during the summer of July-August 2021. The authors confirm that this article's content has no conflicts of interest.

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