

RESEARCH ARTICLE

Impact of Sericulture Certificate Courses Offered by Tamil Nadu Agricultural University in a Distance Mode

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ABSTRACT

The study aims to assess and evaluate the course's effectiveness and its impact on various stakeholders. An impact study seeks to understand how well a program or course, achieves its intended objectives and how it affects the participants, the institution, and the broader community. Sericulture, the art, and science of making silk, has played a significant role in human culture for many years as a source of luxury, wealth, and employment in rural areas. In response to this demand, Tamil Nadu Agricultural University is offering Sericulture certificate programmes in distance mode. It has arisen as a potential way to educate and enable people from every aspect of life, particularly those living in rural regions, to engage in this lucrative industry. Sericulture course was chosen among 41 certificate courses and responses were collected from the successfully completed learners. This paper attempts to explain the impact of the course concerning eight various dimensions that describes the level of impact attained by Sericulture certificate course among learners. As, the study investigates the impact obtained by past learners, the research design Ex post facto design was utilized to conduct the study. The sample for the study was successful learners who had completed their certificate course during the year of 2019 (55) and 2020 (32) as total 87 successful learners were taken for the study from various districts in Tamil Nadu. Chi square test revealed that there is significant association between Geographical distance (0.016), Job aspiration (0.057*), Experience in Sericulture (0.009), Attitude towards Entrepreneurship (0.007) and Motivation (0.056*) with Impact of Sericulture certificate course. The study shows that majority of the learners benefited by completing the Sericulture certificate course and it created good impact among learners.

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INTRODUCTION

Sericulture, the practice of rearing silkworms to produce silk, requires a comprehensive approach that encompasses the growth of not only the technical aspects of Sericulture but also the cognitive, psycho-motor, and affective domains. Sericulture is not only a theoretical field of study but also an applied science that calls for practical expertise, critical thinking, and an all-encompassing perspective. The knowledge and intellectual skills needed for Sericulture are referred to as the cognitive domain. In order to increase productivity and sustainability in agriculture, people need to be able to think critically, make defensible decisions, and apply scientific information. Distance learning makes it simple to access high-quality instruction and allows for the simultaneous instruction of many learners. Since 1800's, several developments have gradually broadened the application of distance education, bringing its advantages to increasing

population. These developments include postal services, radio and television transmission, and the Internet. Since its establishment in 1971, the Tamil Nadu Agricultural University in Coimbatore, Tamil Nadu, India, has a proven track record of offering distance-education programme through print and electronic media. The Directorate of Open and Distance Learning (DODL) was setup in the year of 2005 and made regulations in offering distance education programme according to the current education system trend and learners perspective.

TNAU is offering various categories of distance education programme like Certificate courses (41), Diploma Courses (13), Special Certificate Course in Herbal Formulation and Technology, Online Certificate Courses (6) and Crash Programme on Innovative Farm Technology. Among which the certificate courses were chosen in particular for this study. Certificate courses were very much suitable for the heterogeneous groups

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with varied demands. Midst of the 41 certificate courses offered at the DODL of TNAU, 40 were offered in vernacular language Tamil and 1 were offered in English among which Sericulture course which was offered in Tamil medium of instruction was selected as it was, skill based, technical, highest enrolled, highly preferred and has higher scope for entrepreneurship. Even though Directorate of Open and Distance Learning (DODL), TNAU is offering many courses, Certificate courses are the most important one which makes significant and effective imparting of knowledge, this has been proved by many numbers of study. Sridevi Krishnaveni (2015) stated that Certificate programmes are the most flexible, skill-oriented, and most enrolled programmes among all the courses provided by the Directorate of Open and Distance Learning (DODL) of Tamil Nadu Agricultural University (TNAU), as well as the one that students seeking entrepreneurship like the most. Sericulture, a significant farming venture in Tamil Nadu, is an environmentally benign, agriculturally based, less man power requirement, low input, and commercially appealing farm activity that falls under the cottage and small-scale sector. By understanding the importance of Sericulture and its profitability for small and marginal farmers with small level of investment capital, Tamil Nadu Agricultural University offering Sericulture certificate course in a distance mode.

Sericulture is a power to generate money more rapidly than many other agricultural pursuits is one of its main advantages. Due to the short lifespan of silkworms, several generations can be produced and collected in a single year. Compared to growers of other crops, Sericulture farmers may make cash more quickly because of this quick turnover. Farmers are becoming interested in Sericulture since it requires little initial capital and produces excellent returns rapidly. It is the best strategy for raising both the rural economy's standing and farmers standard of living. Sericulture, one of India's main economic sector, significantly lowers poverty. One cottage industry that provides rural inhabitants with greater job alternatives is Sericulture (Dewangan SK, 2011). The continuous availability of mulberry leaves throughout the year due to favourable climate that ensures a consistent supply of food for the silkworms, enabling uninterrupted rearing and cocoon production (Mousumi Malo, 2022). With its notable features, Sericulture plays a crucial role in improving the economic conditions of rural communities by offering employment prospects for educated rural youth and women workers (Vinod Ekka and Pratima Bais, 2023). Silk is produced through three preliminary phases before being delivered to other parties in the supply chain for the intended product (Ruyida Mushtaq, 2023).

Mulberries have bioactive properties that suggest the existence of chemicals with antibacterial, anti-inflammatory, antioxidant, antitumor, and anticancer effects (Singhal *et al.*, 2010, Wang *et al.*, 2013, Yuan and Zhao, 2017, Grzekowiak *et al.*, 2022). Despite challenges,

distance education has emerged as one of the most effective means of disseminating knowledge and democratizing information, leading to an a rise in its usage and prominence across all contexts (Alves *et al.*, 2018).The Certificate course gives complete information about the Sericulture from season to marketing. As the course fee was very low as Rs.2500 and the eligibility to join the course was SSLC which attracts lots of dropout students to join the course and to start a business. Compared to other businesses, Sericulture requires very low investment and very less manpower comparatively. The Sericulture Certificate course makes a very strong basement for anyone who doesn't have any farm background. Some of the Sericulture Certificate Course enrollee was already performing Sericulture business in order to get aware of New Technologies with Sericulture, Integrated Scientific Management to get better profitability from silkworms and to know about various Government Subsidies and schemes available for their business. The practise of raising silkworms to produce silk and cocoons is known as Sericulture. India is the second-largest Sericulture producer in the world after China.

MATERIAL AND METHODS

The research was conducted purposefully at Directorate of Open and Distance Learning (DODL) of Tamil Nadu Agricultural University. Sericulture course is related to cultivation techniques alone which have much scope for establishing commercial ventures and the course has maximum numbers of enrollers. Hence it was purposefully selected for the study. The list of the students enrolled in the course for the year 2019 and 2020 was collected in order to study the impact. The students who have successfully completed the course were only considered to be the respondents of the study. A well structured questionnaire was prepared and conducted personal interview with 87 respondents from various districts in Tamil Nadu. The Impact of the course was measured by categorizing into eight dimensions as Economic, Social, Agronomical Management, Silkworm rearing practices, Risk bearing behaviour, Motivation, Knowledge and Marketing behaviour. The data were collected using five point continuum scale from Strongly Disagree to Strongly Agree and the calculated Mean score for each statements in order to rank it from higher mean value to lower mean value. Then, Impact dimensions were analyzed with other independent variables by using Pearson's chi square test in order to unearth significant variables with impact.

Chi square is given by:

$$\chi^2 = \sum_{r=1}^R \sum_{c=1}^C (O_{rc} - E_{rc})^2 / E_{rc}$$

With degrees of freedom (ν) given by (R-1) (C-1), where:

R: Rows of the contingency table

C: Columns of the contingency table

O_{rc} : Observed frequency in row (r) and column (c)

RESULTS AND DISCUSSION

The highlights of the results that have emerged out of the study were enumerated in this part of the paper. The Table no. 1 describes the impact of Sericulture certificate course in various dimensions and also highlights the key statement in each dimensions with ranking in a order of mean score for each statements.

The study revealed that **'Employment available throughout the year'** by practicing Sericulture was the major impact in Economic dimension. In rural areas many of the small farmers facing unemployment during their off season and they are unable to cultivate crops with a fear of crop loss. But Sericulture growers can run their business around the year without any pause. As Mulberry is a perennial crop, the planting of cuttings will be carried out at the beginning of monsoon in order to achieve a higher success rate. So there is a need for minimum amount of water during dry periods. The majority of the growers have performed twelve batches successfully in a one year and many of the respondents had reported that certificate course helped them to plan accordingly with duration of silkworm rearing. This helps to improve the profitability of Sericulture entrepreneurs, and they ranked employment availability throughout the year as first rank with the mean Score of 4.18.

In social dimension, **'Contact with Scientists were increased'** was ranked one with the mean score of 4.24. As Majority of the respondents had rural background, they have only limited access to Agricultural Officer, Assistant Agricultural Officers, Horticultural Officers and Assistant Horticultural Officers, Assistant Director of Agriculture and Horticulture will be the maximum. So, they have only limited sources to get information and as well as sharing their situation. This Sericulture Certificate Course helped majority of the learners to get in contact with Sericulture scientists as well as higher officials in their study centre and Directorate of Open and Distance Learning. Higher the contact with the scientists helped the growers to get adequate information and clarifications.

With regard to Agronomical Management dimension, **'Recommended Irrigation Schedule Adopted'** was ranked first by the majority of learners with a mean score of 4.09. Irrigation was an important operation in every crop production as, it plays a major role in the absorption of nutrient

elements by the crop from the soil. The irrigation water tends to dissolve the nutrients present in the soil. Through each growth stage, mulberry plants need a consistent water supply in sufficient quantities. Lack of water can cause water stress, diminished growth, and a reduction in the amount of leaves that are produced. Mulberry leaves are the sole food source for silkworms in Sericulture. High-quality and abundant leaves lead to better silk production, both in terms of quantity and quality. In Sericulture, the synchronization of leaf production is essential to ensure a continuous supply of food for silkworms. Proper irrigation helps in managing leaf maturity and timing of harvest. Majority of the farmers mentioned that the recommended irrigation schedule of 10-14 days interval at a rate of 1.5 to 2 inches height, helped to avoid root rot as well as dry condition.

Silkworm rearing is one of the important dimensions which measures the impact enjoyed by the learners. **'Favourable conditions for larval development'** was ranked first by majority of Sericulture certificate learners. The quality of silk largely depends on the quality of the cocoons. Healthy, well-nourished larvae produce better silk threads, resulting in higher-grade silk fabric. Providing favourable conditions ensures a higher survival rate of the larvae. Higher survival rates lead to a larger number of healthy larvae reaching the cocoon stage, which is crucial for maximizing silk production. Very low survival rate of silkworm was one of the major constraints that limit the farmer's income level. The certificate course provided better understanding about silkworm survival conditions with adequate practical exposures. Thus, it is the major impact in an Silkworm rearing dimension and ranked first with the mean score of 4.52.

The findings of Risk bearing behaviour showed that **'Diversifying business activity to avoid risk'** was strongly agreed by majority of the Sericulture entrepreneurs and it is ranked first with the mean score value of 4.87. By diversifying their business activities, Sericulturists can maintain a more stable income stream throughout the year. For instance, investing in multiple products like silk, mulberry leaves, and Sericulture related products can help to balance the seasonal income variations. Diversification opens up new market opportunities for Sericulturists. For example, apart from silk, there may be a demand for other products such as mulberry-based products, silkworm by-products, or even eco-friendly Sericulture related services. Engaging in diverse activities encourages Sericulturists to develop a broader skill set and knowledge base. This adaptability helps them cope up with challenges and stay competitive in the evolving market.

In Motivation dimension, **'Able to estimate Inputs and Expenditure in prior'** after completion of Sericulture certificate course was strongly agreed by majority of the respondents and it was ranked as first with the maximum mean score of 4.90. As, prediction and working out of required inputs and expenditure in prior will require more experience and wider knowledge. Thus, the Sericulture certificate course,

provides adequate knowledge about inputs requirement for entire batches and expenditure required in according to the land area and rearing house area. This helps to estimate in prior, this motivates a large to practise Sericulture.

With respect to Knowledge dimension, '**Different pruning method according to their needs**' has strong impact among majority of the respondents and it was ranked first with the maximum mean score of 4.45. Proper knowledge and understanding of pruning techniques are crucial to avoid over-pruning or causing harm to the mulberry plants. There are different types of pruning like Bottom pruning, Middle pruning and Kolar (or) strip system of pruning. Pruning will be done accordingly to their needs and situations. For e.g., Kolar Pruning was done in a very closed system of planting. The branches are cut at ground level every time. Thus, it receives five pruning's every year.

Finally, the important dimension in all the enterprises. i.e., Marketing dimension which impacted a lot among all the dimensions. Among marketing dimensions, '**A white coloured cocoon fetches more price in market**' was an most strongly agreeing information among majority of the respondents and ranked first with the mean score of 4.94. Before attending the course programme, majority of the Sericulturists thought only cocoon weight gives more profitability. But now, they are aware about grading of cocoons and a white coloured cocoon gives more value than other cocoons. White cocoons are known to produce silk of superior quality. The silk fibres from white cocoons are usually finer, smoother, and have a higher luster, which results in a higher-grade silk fabric. In many markets, there is a higher demand for white silk due to its versatility and ability to be dyed into various colours. White silk can easily take on vibrant and deep colours during the dyeing process, making it popular among consumers and designers.

These are various dimensions of impact of Sericulture Certificate course which is offered under Directorate of Open and Distance Learning, Tamil Nadu Agricultural University, Coimbatore.

Next, in order to see the relationship between Independent variables and Impact of Sericulture certificate course, the chi square test was done. The below Table No.2 showed the relationship with significant variables to the Impact of Sericulture Certificate course.

It is revealed from Table 2 that correlation analysis of data found that the Experience in Sericulture (.009) and Attitude towards Entrepreneurship (.007) were positively associated at a 0.05 % level of significance and then Geographical distance (.016), Job Aspiration (.047) and Motivation (.036) were positively associated at 10% level of significance with the impact of Sericulture certificate course.

The results depicted that five variables significantly exert their influence on the impact of Sericulture Certificate Course. Hence the result confirmed the following hypothesis.

Ho: There is no relationship between the selected independent variables and the impact of Sericulture Certificate Course. Therefore, this hypothesis is rejected.

Ha: There is a relationship between the selected independent variable and the impact of Sericulture Certificate course. Thus, alternate hypothesis is accepted.



Table.1. KVK interventions in Promotion of Pulses varieties and technologies among farmers of Tiruchirappalli district (2016-2021)

S.No	Impact Statement	Mean	Rank
I. Economic Dimensions			
1.	Annual Income was Increased	4.18	II
2.	Able to increase the size of land holdings	2.30	V
3.	Increase in Standard of Living	3.98	III
4.	Employment available throughout the year	4.46	I
5.	Helps to Purchase the modern farm implements	1.66	VI
6.	Able to develop the infrastructure of their house	2.62	IV
II. Social Dimensions			
1.	Children Educational Standard was improved	1.69	IV
2.	Increase in Socio Political Programme Participation	3.52	II
3.	Migration from Village to Cities have reduced	3.26	III
4.	Contact with Scientists were increased	4.24	I
III. Agronomical Management Dimensions			
1.	Drip Irrigation System was installed	3.03	IV
2.	Closer Planting was Avoided to reduce weeds	3.09	III
3.	Use of Organic Manure and bio Fertilizer	4.01	II
4.	Soil Testing Adopted	2.95	V
5.	Planting carried out in the beginning of Monsoon	2.82	VII
6.	Land Preparation according to Perennial Crop	2.86	VI
7.	Recommended Irrigation Schedule Adopted	4.09	I
IV. Silkworm Rearing Dimensions			
1.	Hygienic and Scientific Management method Adopted	4.03	II
2.	Disease free seeds usage (Larval Eggs)	2.92	XVI
3.	Separate house for Early and Late Aged Larvae	3.45	V
4.	Dis infection of rearing shed appliances	3.04	XIII
5.	Emphasis to whole shoot feeding	3.23	VIII
6.	Separate trays for Early aged larvae	2.87	XVII
7.	Indoor Conditions for Silkworm rearing	3.08	XI
8.	Paraffin paper to maintain proper humidity	3.98	IV
9.	Precaution against Silkworm diseases	3.40	VI
10.	Cocoon harvest prior to adult emergence	2.99	XIV
11.	Larvae fed with sufficient amount of leaves	3.10	X
12.	Rearing shed protected from water logging conditions	2.95	XV
13.	Dead cocoons removal from mountages	3.13	IX
14.	Upgrading information from Tamil Nadu Agricultural University Sericulture Project	2.78	XVIII
15.	Preliminary operation for early aged larvae	3.06	XII
16.	Maximum Skill synchronizing with each stage of larval development	4.02	III
17.	Favourable conditions for Larval Development	4.52	I
18.	Silkworm not fed with insecticide sprayed leaves	3.26	VII
IV. Risk Bearing Behaviour Dimensions			
1.	Avoiding risk by diversifying business activity	4.87	I
2.	Taking more risks successfully	3.22	III
3.	Taking maximum risks only there is a chance of success	2.92	V
4.	Trying entirely new method in Sericulture involves risks but it is worth.	3.10	IV
5.	Do you feel that who is willing to take greater risk than the average Sericulture is usually financially sound?	3.70	II
V. Motivation Dimensions			
1.	Able to prepare calendar of operations	4.56	IV
2.	Aim should be to obtain more profits out of less Expenditure.	4.72	II
3.	Techniques which give high profit leads to motivate for its adoption.	4.63	III
4.	Sericulture business gives more profit in short duration.	4.23	V
5.	Locating different sources of availability of credit.	4.03	VI
6.	Sericulture requires very less Man power	3.14	VII
7.	Able to estimate Inputs and expenditure in prior	4.90	I



VI. Knowledge Dimensions			
1.	Organic Manures applied as basal dosage (10 to 30 tonnes /ha)	3.66	VII
2.	Different Pruning Methods matching to the need	4.45	I
3.	Major Diseases of Mulberry plants	4.30	II
4.	Wet gunny bag/ leaf chambers' are used for leaf preservation.	4.26	III
5.	Mulberry leaves are used for protein supplementary diet for Human beings.	3.24	XI
6.	Mulberry root has anti diabetic properties.	4.22	V
7.	Mulberry fruit,juices can be used for curing sore throat fever and diseases like dyspepsia, melancholia.	3.33	IX
8.	Silkworm litter can be used in compost making, biogas production and used as cattle, poultry feed.	4.23	IV
9.	Chlorophyll paste,proteins and plastic material can be prepared from silk worm litter.	4.21	VI
10.	Mulberry tea is reported to reduce blood pressure.	3.64	VIII
11.	Leaves are rich in glucose, fructose, sucrose, dextrin, galantine and crude fibers.	3.27	X
12.	Silk used for manufacturing of many luxurious products like saree, silk carpets, kurta, salwar, interior decorationmaterial.	3.09	XII
VII. Marketing Behaviour Dimensions			
1.	White coloured cocoons fetches more price in market.	4.94	I
2.	The cocoons may be sold in the mid - pupal period to get optimum returns.	4.06	IV
3.	Proper packing of cocoons to avoid transport losses and damage.	3.56	VI
4.	Following proper grading methods for the sale of cocoons in the market.	4.02	V
5.	Deciding market place where competitive price for the produce is more.	4.30	II
6.	Market intelligence on cocoon prices of various markets	4.26	III

Table No. 2 : Relationship between Impact of Sericulture Certificate course and Independent Variables

S.No	Independent Variables	Pearson Chi Square		
		Calculated Value	Degree of freedom	P- Value
1.	Age	29.368	36	.775
2.	Gender	10.758	18	.904
3.	Educational Status	45.774	54	.780
4.	Occupational Status	113.666	108	.336
5.	Annual Income	41.519	54	.893
6.	Geographical Distance	142.017	108	.016*
7.	Job Aspiration	26.575	18	.047*
8.	Experience in Sericulture	37.555	54	.009**
9.	Rural Urban Background	12.285	18	.832
10.	Computer Knowledge	16.663	18	.546
11.	Information Seeking Behaviour	71.243	90	.928
12.	Information Sharing Behaviour	100.029	108	.695
13.	Attitude towards entrepreneurship	25.612	27	.007**
14.	Social Participation	57.015	54	.364
15.	Progressiveness	56.787	54	.372
16.	Motivation	152.183	126	.036*

Conclusion

Indeed, Sericulture can be profitable enterprise when practiced with a scientific approach. The success and profitability of Sericulture depend on various factors, including proper knowledge of Sericulture practices, effective management techniques, and the adoption of modern scientific methods. Certificate courses offered by the Directorate of Open and Distance Learning (DODL), Tamil Nadu Agricultural University, Coimbatore are designed to provide aspiring Sericulturists with the necessary scientific knowledge and skills to excel in the field. The Sericulture Certificate course was the most valuable one because it gives excellent scientific knowledge, practical exposure to best practices, helps with skill development, leads to the adoption of modern techniques, reaches a diversified audience and satisfy their needs, helps entrepreneurship development, promotes sustainable practices and provides certification which adds credibility to their knowledge and skills in Sericulture domain. Based on the findings, the Sericulture certificate course was found to be more effective and created an impact on various dimensions. Considering the course's success rate and impact value based on the successful venture owners, it can be concluded that the institution has never compromised on the quality of technology delivery.

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COMPETING INTERESTS

Authors have declared that no competing interests exist

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