

## REVIEW ARTICLE

## SOCIOECONOMIC IMPACT OF SERICULTURE IN KAVREPALANCHOK AND NUWAKOT DISTRICT OF NEPAL

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## ARTICLE DETAILS

## Article History:

Received 18 September 2023  
Revised 21 October 2023  
Accepted 24 November 2023  
Available online 31 December 2023

## ABSTRACT

The field survey was conducted to know the socioeconomic status of cocoon producing farmers in Namobudhha municipality and Myagang rural municipality of Kavrepalanchok and Nuwakot districts of Nepal. The findings of the study showed 90% of farmers involved in cocoon production belonged to 30-60 age groups from both Municipality. The literacy rates in the study area were noted as follows: illiterate (59%), primary school-educated (30%), secondary school-educated (4%), intermediate-educated (4%), and those with a higher level of education (3%). Most of the Brahmin, Chhetri and Tamang groups were involved in cocoon production. Regarding the socioeconomic status 51.6% farmers income was between Rs.51-100 thousands and 58.57% male were involved in farming. factors used for cocoon production .The profit level from cocoon production was medium.. The average gross margin per 137kg cocoon production was calculated Rs. 31,436.53 per year hence benefit cost ratio was estimated 1.47. Poor technical knowledge about rearing, Cutoff of the subsidy, year round low price of cocoon were the major problems associated with the production and marketing of Cocoon. This research explored the economic feasibility of cocoon production and major problems in Cocoon production and marketing in Kavrepalanchok and Nuwakot Districts. So, availability of modern means of technology and awareness to farmers for involvement in cocoon rearing is necessary to upgrade the socio-economic status of farmers.

## KEYWORDS

Cocoon, Sericulture, Socio-economic, B/C ratio, Cobb Douglas

## 1. INTRODUCTION

## 1.1 Background Information

Agriculture has long been in the mainstream of Nepali society; the topography and natural resources of Nepal are quite suitable for agricultural production. Though, its topography determines only 28% of cultivable land, 21% is cultivated land and remaining 7% is uncultivated land (AITC, 2020). In Nepal, 65.6% of the population still adopts agriculture as their livelihood's options of which male share 60.2 % and female 72.8% (MOAD, 2017). Agriculture and forest contribute 26.50% share of GDP. Fishery contributes 0.48% and non-agriculture sectors contribute 73.02% of GDP (AITC, 2020). It comprises various components such as cereal, vegetable, fruit, oilseed, cash crops, pulses, spices, fishes and so on. Though sericulture as cash crop contributes little on gross domestic production but can be vehicle for poverty reduction and employment generation especially in rural areas of Nepal.

Silk production (known as sericulture) is a form of agriculture that is based on mulberry silkworms (*Bombyx mori*), a species of moth native to China that was domesticated from a wild relative, *Bombyx mandarina* (with which *B. mori* can still hybridize). Molecular studies indicate an origin of flightless *B. mori* from *B. mandarina* in China some 4600 years ago (Arunkumar et al., 2006). Sericulture is the art of rearing silkworms from the production of silk and bi-product (Phalguni, 2016). Mulberry (*Morus spp.*; Moraceae: Urticales) is the sole hostplant for silkworm *Bombyx mori* L. (Zhishen, 1999).The silkworm takes necessary nutrients for their growth onlyfrom mulberry leaves. The nutritional parameters of mulberry leaves andsilk production are indirectly proportional to each other.

It involves mulberry cultivation, silkworm rearing, and post-cocoon activities that result in silk yarn production. Sericulture in Nepal has a relatively short history. It has been 45 years since sericulture was introduced in Nepal and it still struggles to compete in the international market. The lack of progress becomes clear if we compare sericulture in Nepal with that of neighboring countries (Upadhyay, 2013). Despite the poor performance of sericulture enterprises in Nepal, it can be a way to provide gainful employment, economic development, and improvement in the quality of life to the people in the rural area. And therefore, it can play an important role in the anti-poverty program and prevents the migration of rural people to the urban area in search of employment (Reddy, 2008). Sericulture is a labor-intensive, Argo-based rural industry that produces incomes on a seasonal basis and generates about 16 person-year of employment for every hectare of plantation (Erappa, 1985). China and India contribute over 60% of the world's annual production of silk. After China, India is the second-largest producer of raw silk. Sericulture is a significant source of employment for rural peoples.

## 1.2 Statement of the Problem

The Kavreplanchowk and Nuwakot district has not undergone any socioeconomic survey to date, despite holding a distinctive comparative and relative advantage on its topography and climatic conditions. Long history of adopting this practice but still this enterprise has various problems such as insufficient channel and network, lack of seed marketing knowledge and extension, cut off of yearly subsidy (Sharma et al., 2021). The cocoon market is vulnerable due to quality concern and sustainable production and marketing (Kiran et al., 2022). Year round fixed low price, incidence of disease and pest, mortality of silkworm are the major problem observed in cocoon production (Purushotham, 2009).

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DOI:  
10.26480/seps.01.2025.57.71

Majority of the farmers in these districts solely depend on traditional method of cocoon productions. Despite of the time and effort they have invested, they have not been able to receive expected output from silkworm rearing. The productivity and profitability of cocoon productions is not satisfactory and crops like, potato having max. C\B 3.29 and min.1.49 (Dhital, 2017; Bhat, 2014). are slowly replacing silkworm. The Price spread of cocoon is also not satisfactory (Sharma et al., 2021). Apart from these environmental management, wild animals, technology, irrigation, timely availability of disinfection and egg also plays important negative role in silkworm and cocoon productions.

### 1.3 Rationale of the Study

Mulberry Plant is the main feed for growth of silkworm with 1538 ha of land being used for its cultivation total production 39 Mt (Molad, 2020/21). The study has been done to take the moral and legal status of farmer who came under silkworm rearing and cocoon productions These setbacks have had an adverse effect on farmers' income and limit the expansion and commercialization of the silkworm rearing and cocoon productions (Dar, 2009). This study helps to analyze the existing scenario of cocoon productions; identify the knowledge status of farmers, effectiveness of governmental programmes and subsidies, and the hurdles that await on the path to sustainable and profitable cocoon productions. The study seeks to contribute to farmers by addressing gaps in understanding specific economic parameters, such as the BC ratio, GM, NP etc.

This study aims to provide policy makers with insights to formulate effective policies that support and promote the sustainable growth of the cocoon production industry in Nepal. Stakeholders, businesses, and agriculturists can use the results of this analysis to make evidence-based decisions that contribute to economic resilience and growth (Hadimani, 2017; Hanumappa, 1993). It can also serve as a basis for feedback for the formulation and implementation of plans and programs that may prove to be effective for the concerned stakeholders within the district. This study will assist in developing strategies and policy for relevant organization, especially to prepare and develop such programs that ensure to increase productivity of silk (Kanezz, 2018; Kumaresan, 2005).

### 1.4 Objectives

#### 1.4.1 General Objective

To study the production and socio-economic status of cocoon producer in Nuwakot and Kavrepalanchok district of Nepal.

#### 1.4.2 Specific Objectives

To assess the production status of cocoon in Kavrepalanchok district of Nepal To determine the benefit-cost ratio (B/C ratio), gross margin and return to scale of cocoon production To identify the major problems of cocoon producer in the production and marketing of cocoon

## 2. LITERATURE REVIEW

### 2.1 Origin and history of Sericulture

The word sericulture has been derived from the Greek word 'sericos' which means 'silk' and the English word "culture" means 'rearing'. Sericulture is the art and science of rearing of silkworms for the production of raw silk and its end product is silk (Levent and B. P, 2019). The legendary Chinese empress Xi Ling Shi is said to have discovered the process of sericulture around 2700 BC. Modern silk industry is rooted in the historic production of silk fabric that began in China from around 3,000 B.C. when raw silk was processed by hand. The raw silk used to make thread for textile was derived through a delicate process from cocoons spun by mature silkworms raised on mulberry leaves (Mattigatti et al., 2009). Though this process and related technology was later transferred to Europe and to Asian countries including India, Japan, Uzbekistan silk clothing continued to be enjoyed only by the privileged (Kinjo, 2017). At present time, China and India together have monopoly in total cocoon productions in the world. China has a share of 80.06 per cent in the world production of silk, followed by India, which has a share of 17.77 percent (Rasuljonovich, 2020).

According to historical records from (SDC, 2020) The first attempt at sericulture (silk farming) in Nepal was made in 1911 by the Rana Prime Minister Chandra Shamsher, who imported silk worms and technical knowledge from India but due to lack of manpower it is soon closed. In the second attempt, during the reign of Rana Prime Minister Juddha Shamsher in 1940, skilled individuals were brought from India to Kathmandu to showcase silk farming and demonstrate silk reeling (Bahar, 2011). Exhibitions were organized in Jhapa to promote sericulture, and Tharu and Rajbanshi communities were encouraged to take up silk farming. The

third attempt at sericulture took place in 1950 in the Godavari area, where Kimbu Viruwa was grown, but it was not sustained (Muruges, 2019). In the fourth attempt in Nepal in 1953, the Department of Cottage and Small Industries started silk farming with the help of Indian experts who showcased silk reeling from Kimbu Viruwa brought from India.

However, due to inconsistent supply of Kimbu Viruwa, lack of skilled technicians, and disease outbreaks, this attempt also failed. Efforts were made in Nepal to promote sericulture through repeated attempts, and in 1967, the then Ministry of Agriculture Education and Research conducted a study on the feasibility of silk worm cocoons from India, brought to the royal court of Rana rulers, by using the Kimvua Veruva technique, which resulted in a good outcome (Ganie, 2018). Therefore, a 10-year agricultural plan was implemented in 1971 with the aim of developing commercially important silkworms. As a result, the Silk Farming Center, including the Mauri, was established under the name of the Commercial Entomology Program in 2032 BS (1975 AD).

After an inspection by the late King Birendra Bir Bikram Shah in 2042 BS (1985 AD), the center was relocated from Kophasi to the Godavari area of Lalitpur for silkworm farming. Since 2043 BS (1986 AD), Kophasi has only managed the sericulture program. Now, after the restructuring of the Department of Agriculture in 2052/53 BS (1996/97 AD), the Silk Development Branch of Kophasi has been established and is currently operating the program (Nadarge et al., 2017). In 1996, Japanese specialist Mr. Masaru Chujukale brought various suitable tree species such as Gariyo, Khwai Chingo, Kenmochi, Yuki Masari, Michuisiger, etc. from Japan as a goodwill gesture to grow in the high mountains of Nepal. The Nepal Rastra Samiti had also distributed Chinese hybrid and Victor 1 seedlings from India.

### 2.2 Sericulture in Nepal

Sericulture in Nepal Sericulture is an imported commodity and was promoted mainly by government sectors since 1930s. There are nine government farms for the promotion of sericulture in Nepal. Among them, the Sericulture development center, Khopasi is the central farm and the other eight farms are provincial. In Nepal, farmers mainly practice mulberry-based sericulture (Kumaresan, 2008). The geographical diversity of the country provides the opportunity for sericulture farming in Nepal. In terai (100 m to 750) and hilly region (750 to 1500 masl) are the appropriate place for sericulture farming in Nepal. But with the same technology, sericulture productivity is changing fast with an upward trend in India. In Nepal, there is not only lower productivity of sericulture but the number of farmers is still in decreasing trend (Ratho, 2019).

### 2.3 Cost and returns analysis of Sericulture

The benefit cost ratio of sericulture is found to be 1.32 which is profitable (Sharma et al., 2021). The Expenditure in the establishment of the, mulberry garden (30.6%) and Larva rearing structure (69.4%) (SDC, 2020).

S. N	INPUTS	%(EXPENDITURES)
1.	Human labor (family)	32.24
2.	Machine labor	13.43
3.	Saplings/Planting material	26.38
4.	Farm yard manure (FYM)	14.11
5.	Fertilizer	5.31
6.	Interest on working capital	8.50

Source; (Kiran Lata, 2022)

### 2.4 Price spread of silk

In sericulture, the price spread refers to the difference between the amount of money the sericulturist earns by selling their raw silk cocoons or yarn, and the amount of money the middlemen or traders earn when they resell the raw silk to textile mills or silk exporters (Rasuljonovich, 2022). The price spread is determined by factors such as transportation costs, storage costs, processing costs, and the profit margin of the middlemen. When middlemen offer a low price to sericulturists for their raw silk, and then sell it at a higher price to the end buyer, the price spread increases, and sericulturists may earn less income.

**Table 1: Price spread of silk in Nepal**

Value chains	Local producers	Small hand processors	Collectors and deflossers	Reelers, twisters and weavers	Processing unit	Local market
1.	NRs500 per fresh kg cocoon	NRs. 4225 per kg dyed yarn				NRs. 4225 per kg dyed yarn.
2.	NRs. 500 per fresh kg cocoon		NRs. 4225 per kg dyed yarn		Rs 9000 per finished product made out of 1 kg yarn	Rs 9000-25000 with 10% profit margin based on design of silk.
3.	NRs. 500 per fresh kg cocoon -			NRs. 4550 per kg dyed yarn	Rs 9000 per finished product made out of 1 kg yarn	Rs 9000-25000 with 10% profit margin based on design of silk.

Source: (Sharma et al., 2021).

**2.5 Marketing cost of cocoon**

A large share of the marketing cost was accounted for transportation charges in all the three sizes of groups. It formed 54.71, 53.79, and 55.05 percent for marginal, small, large farms respectively (Ramesh, 2009). Cost of preparation to the marketing cost account for 30.59, 30.95 and 29.39 percent in marginal, small and large farms. Miscellaneous charges

accounted for 14.69, 15.24 and 14.54 percent in marginal, small and large farms.

**2.6 Factor affecting Sericulture;**

The identified factors that affect the sericulture are scarcity of water availability, incidence of pest, scarcity of labour, wage rate, and incidence of disease, disease, Climate change, Scarcity of labor, technical guidance, High wage rate (Raveesha, 2009). Price Fluctuation, Market Problem are also major factor that influence the Sericulture Cultivation (SDC, 2020).

**2.7 Mode of marketing channels**



**2.8 Conceptual framework of economic status farmers**

Study focused on how the farming of Cocoon production help in raising the social and economic condition of farmers in Kavrepalanchok and Nuwakot. Factor such as education, age, gender etc. has directly influence the farmer condition (Sharma, 2019). With the adoption of modern agricultural tools, concept of the farming had led the farmer's economic

condition comparatively high as compared to before adoption condition. Literature review was done to analyse the farmer's level condition long with marketing structure of Sericulture. Knowing the new technology, farming in increasing scale have ultimately increased the production, productivity of the Cocoon production in Kavre and Nuwakot This all have great change in the livelihood of Cocoon Producing farmers.

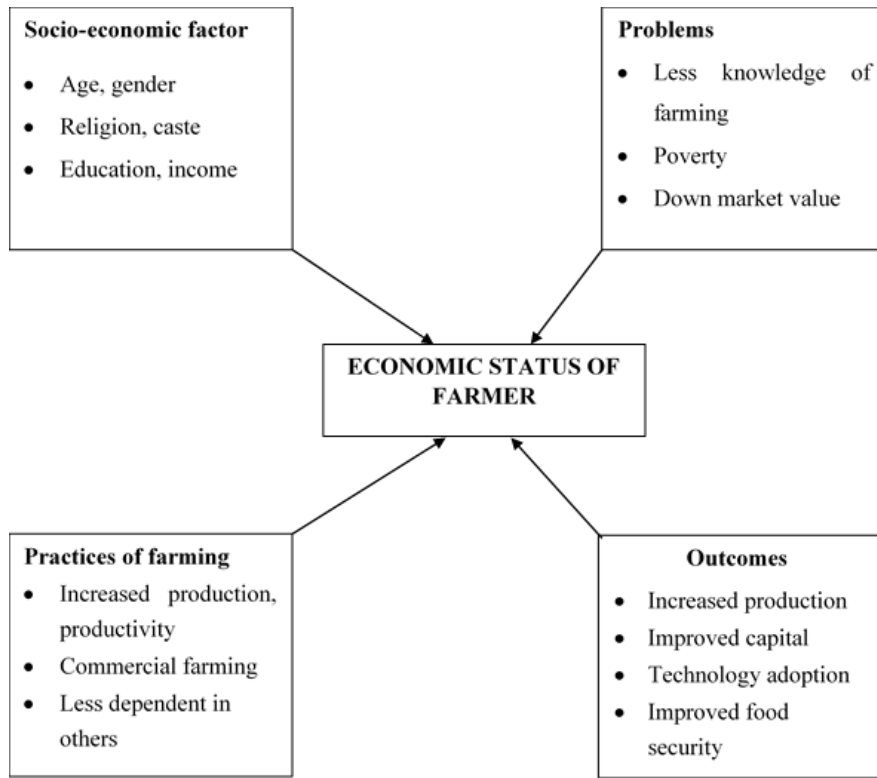


Figure 1: Conceptual framework of economic status of farmer in Kavrepalanchok and Nuwakot Districts of Nepal.

### 3. TREND ANALYSIS

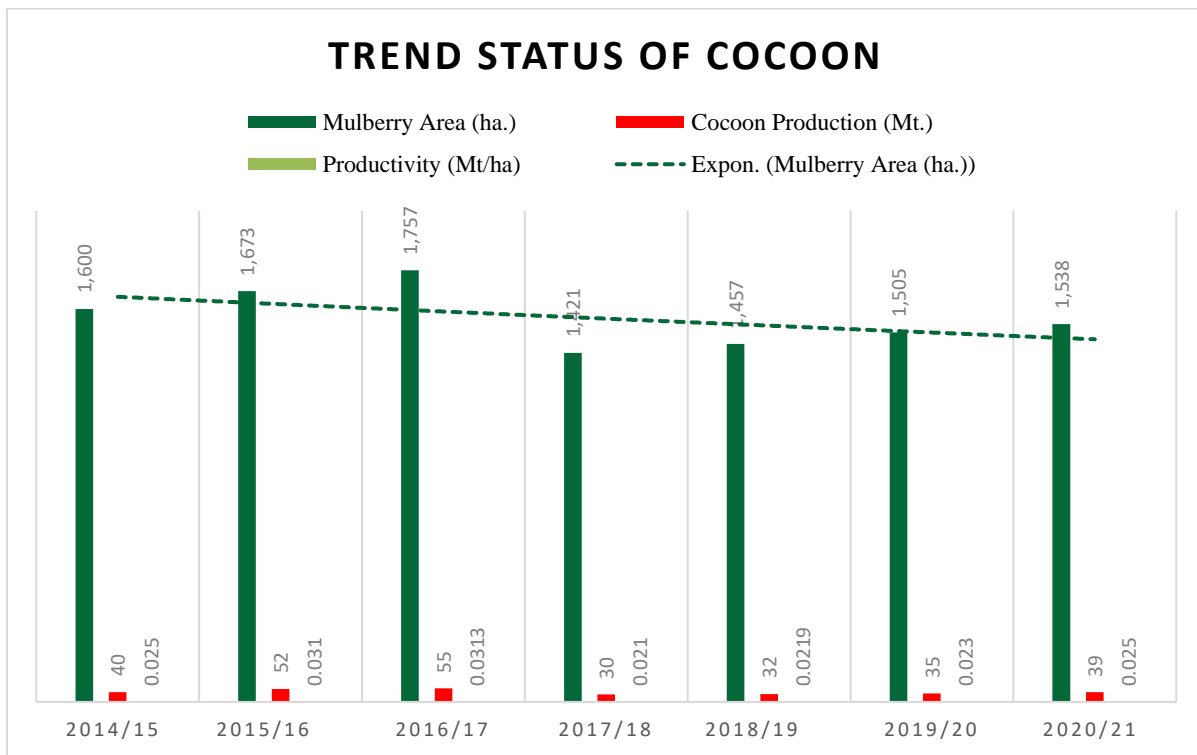


Figure 2: Trend of Cocoon production in Nepal (Source: MoALD, 2022)

### 4. METHODOLOGY

#### 4.1 Background

Present chapter deals with research methodology. It includes selection of study area, selection of respondents, sampling technique used for the collection of primary and secondary data and statistical tools used for analyzing data with respect of objectives of the study.

#### 4.2 Selection of Study Site

The study was conducted in Kavrepalanchok and Nuwakot, a typical mid-hill districts of Bagmati province, Nepal, exhibits immense climatic potentialities to rear different races of Silkworm and produce cocoon. The districts lie within co-ordinates of 27.723° N latitude, 85.164° E longitude, and 27.9194° N, 85.1661° E respectively with altitude of 1007 to 3018 masl. Nuwakot district is a mid-hill district of Nepal. This district has not touched any boundary of other district and foreign country. Bidur as its district headquarter is 70 km away from Kathmandu. The district falls

under sub-tropical and temperate climatic region. The maximum temperature of district is 40°C and minimum temperature is less than 10°C (DADO, 2072).

Main occupation of the people is agriculture. Nuwakot district is one of the backward and least developed districts of the central region. In Nuwakot highest infant mortality and economically people are very poor and the life style is so fragile to change their lives. Male literacy rate is 45.4% and female literate rate is only 18.4%. Due to large Potential, Government shows keen interest in reviving the cultivation. It comes under central government has a main objective to *expand the scope of sericulture farming* the research will be conducted in Namobudhha Municipality of Kavre and Myagang Rural Municipality of Nuwakot. These areas were purposely selected as they are the command area of the SDC, Kavrepalanchok, with highest production potential in the district.

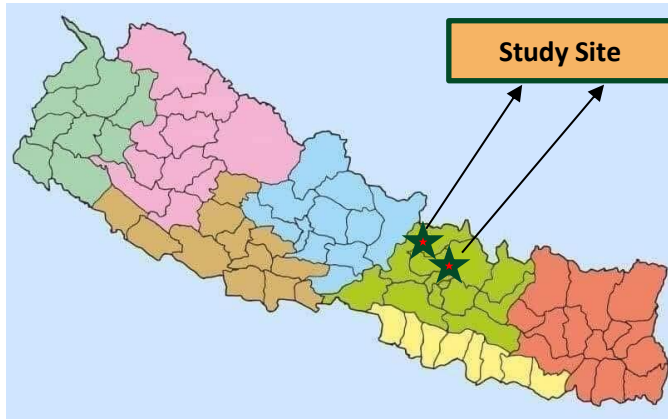


Figure 3: Map showing Districts

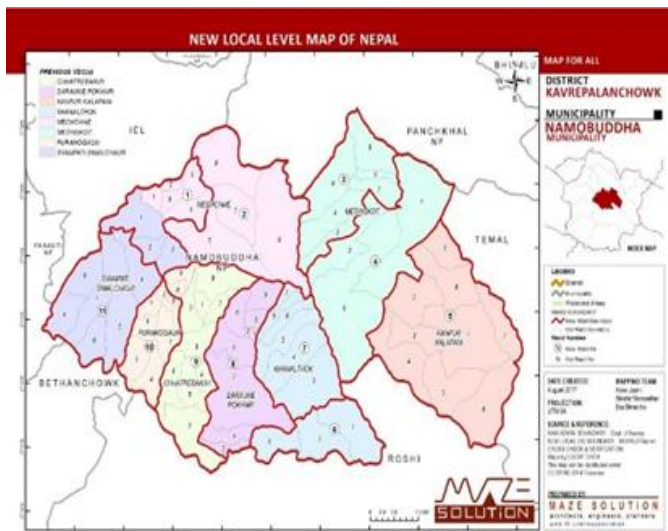


Figure 4: Namobudhha Municipality

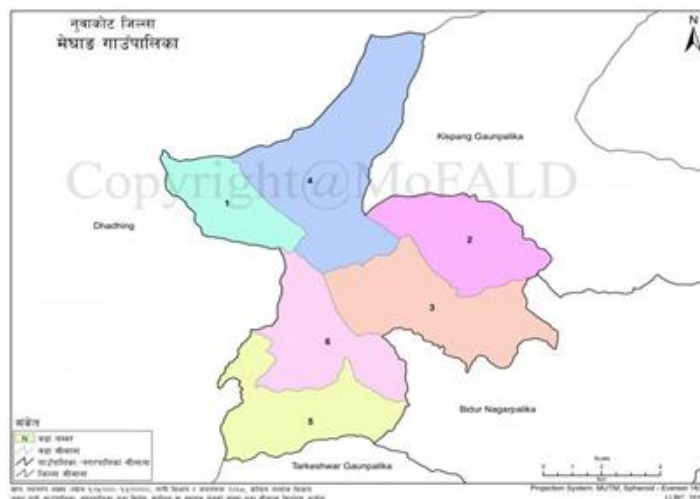


Figure 5: Myagang Rural Municipality

4.3 Duration of the study

The study was conducted from the first week of April to the fourth week of August 2024.

4.4 Sample and Sampling Technique

Cocoon seed producer of the selected area will be the target population for the study. The leading farmers and Mulberry Plant growers are included in the sampling frame. The Cocoon profile prepared by the Sericulture Development Centre is consulted. Household survey is conducted at the major wards involved in Sericulture Cultivation. The farmers are selected after consulting the previous data of SDC in Kavrepalanchok. Because of the lack of time, resources it was very difficult to conduct the household survey in the project area. Therefore, Key Informant Interview and Focal Group Discussions (FGD) is carried out which will represent the small farmers, leading farmers, subject matter specialists and other related stakeholders.

4.5 Research Instruments/ Design

This survey was focused on economic condition of farmers. Following methodologies were employed for data collection.

4.5.1 Preparatory Phase

At preparatory phase, desk review of documents was done. Questionnaires and check lists for the study relating to the Economic Analysis of Sericulture: Production and Marketing Costs of Cocoon, factors affecting and Returns on Investment were done. Sampling criteria and process of methodology was finalized.

4.5.2 Literature Review

Different literature regarding the study areas and other relevant documents were reviewed.

4.5.3 Key Informants Interview

The major key informants were farmers, stakeholders and AKC, Kavre, NGOs, private, CIED, and Centre Officer. They were asked a series of question about present scenario of Economic Analysis of Sericulture: Production and Marketing Costs of Cocoon, factors affecting and Returns on Investment.

4.5.4 Questionnaire Survey

A field survey was conducted in target site i.e,70 farmers during which a series of questions were asked to gather some useful data. Only the questionnaire survey, informal discussions, unstructured questions and field visit were done.

4.5.5 Focus Group Discussion

The target groups were brought together in a discussion to draw out the information about farming system different problems rising in the area and its conclusive solution. Focus Group Discussion (FGD) was conducted after completing the household survey with the help of the checklist to verify the result obtained from household survey, to know the problems of Cocoon production, their adoption patterns with respect to the areas. The participants were farmers, local leaders, all ethnic groups and both male and female was totally inclusive and participatory.

4.5.6 Socio-demographic and Farm Characteristic

The socio-demographic and farm characteristics are used for descriptive analysis of the study areas and study populations. Different variables like family size, ethnicity, land holding, used will be analyzed by using descriptive statistical tools such as percentage, mode, means etc.

4.6 Method of Data Collections

The study being exploratory type, various sources and techniques of gathering information are used. The study employed contain primary as well as secondary data.

4.6.1 Primary Data

The primary data are collected from the farmers of respective site by developing the questionnaire, key informants, farm visit, and personal communication etc. Informal talks were done with local traders, retailers, middleman, and extension workers to get necessary information.

4.6.2 Secondary data

The secondary sources of information were collected from-

- Annual report of Sericulture Development Center, Program Implementation Unit, Kavrepalanchok.

- Previous survey recommendations.
- Publications of DOA, SDC, NARC etc
- Journals

**4.7 Data analysis techniques**

After the collection of data, various assistive media were used for the qualitative and quantitative analysis of data. Software MS-Excel and SPSS were used. Other descriptive statics like graphs, charts and other such tools were used to present data.

**4.7.1 Economic analysis**

This section includes the analysis of production cost, B:C ratio, gross return, net return, market margin and producer's share of consumer's rupee.

**4.7.2 Total cost of production**

It is the total cost involved in production of certain output or product and is calculated as:

$$TC = FC + VC$$

Where, TC = Total cost

FC = Fix cost

VC = Variable cost

Fixed cost indicates the summation of cost incurred in all fixed items and variable cost means summation of cost incurred in all the variable items.

**4.7.3 Gross Return**

It is the total revenue obtained by selling the produced item which is calculated as follows:

$$GR = Q * P$$

Where, GR= Gross Revenue

Q= Total quantity of product marketed

P= Per unit price of the product

**4.7.4 Net Return**

Net return is the profit obtained i.e., difference between gross return and cost of production which is calculated as:

$$NR = GR - TC$$

Where, NR= Net return

GR= Gross return

TC= Total cost of production

**4.7.4.1 Estimation of the cost and BCR**

The collected data will be analyzed using general cost concept tabular analysis. For this, simple table with cost, gross return and input-output ratio, was drafted.

And,

$$BCR = \frac{\text{Gross return}}{\text{Total cost}}$$

BCR > 1: Profitable enterprise

BCR < 1: Enterprise at loss

BCR = 1: Enterprise neither at loss nor at profit

**4.7.1.2 Cobb-Douglass production function**

Among many mathematical models, Cobb-Douglass production function is the appropriate one to study resource productivity as it gives diminishing, increasing or constant return functions. The data, hence, will be subjected to following production function.

$$Y = aX_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} e^{u};$$

In this functional form, 'Y' is dependent variable, and X<sub>i</sub> are independent variables, 'a' is constant representing intercept of the production function and 'b<sub>i</sub>' are the regression coefficients of the respective variables. The regression coefficients obtained from this function indicates the elasticity of the production which remain constant throughout the relevant ranges of the inputs. The sum of 'b<sub>i</sub>' represents the nature of returns to scale when

expressed in logarithmic terms. This function transforms to following logarithmic type:

$$\ln Y = \ln a + b_1 \ln X_1 + b_2 \ln X_2 + b_3 \ln X_3 + b_4 \ln X_4 + b_5 \ln X_5 + b_6 \ln X_6 + \dots + u$$

where,

Y = Total income from Sericulture (NRs.)

X<sub>1</sub> = Plant no. (NRs.), X<sub>2</sub> = FYM (NRs.)

X<sub>3</sub> = labor Cost(NRs.), X<sub>4</sub> = Rearing Structure(NRs.)

X<sub>5</sub> = Technology (NRs.),

u = Error term

a = intercept

ln = natural logarithm

The efficiency ratio ( r ) will be calculated as: r = MVP / MFC

Where, MFC= Marginal factor cost and MVP= Marginal Value Product;

MVP<sub>i</sub> = b<sub>i</sub> (Y/X<sub>i</sub>), and Y and X are the geometric mean values.

**4.7.1.3 Decision criteria**

r = 1 indicates the efficient use of the resources, r<1 indicates overuse of the resources and r>1 indicates underuse of the resources

The relative percentage change in the MVP of each resources calculated as:

$$D = (1 - MFC/MVP) * 100 \text{ or,}$$

$$D = (1 - 1/r) * 100$$

Where, D is the absolute value of percentage change in MVP of each resource.

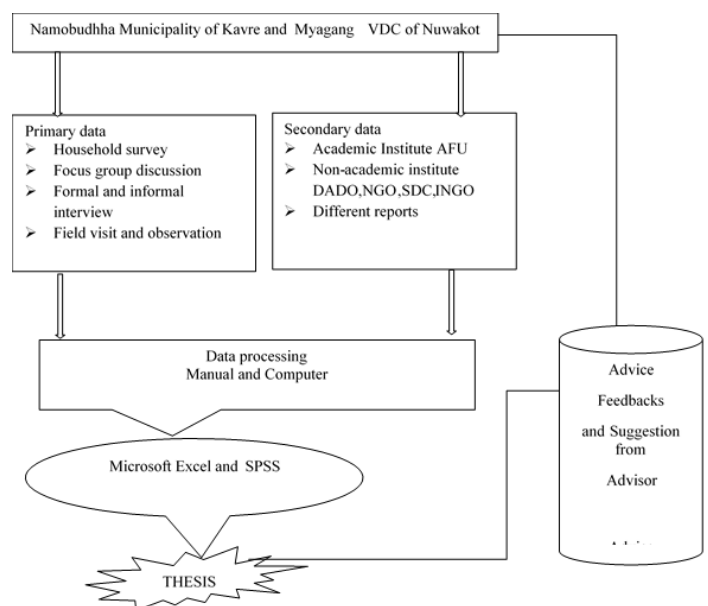
**4.7.1.4 Ranking of problems and perceptions**

The index was prepared mainly taking into account the qualitative data. On the basis of responded frequencies, weighted indexes were calculated for the analysis of farmer's perception on the problem faced in Cocoon productions. Farmer's perception to the different constraints were ranked by using five-point scale of problems compromising very important, high important, normally important, less important and least important by giving weightage on the basis of priority i.e., 1 for the first priority, 0.8 for second, 0.6 for third, 0.4 for fourth and 0.2 for fifth priority. Then the priority index for each variable was calculated by weight age average mean in order to draw valid conclusion and making reasonable decision. The index of importance was computed by using the formula:

$$\text{score} = \frac{\sum Si f_i}{N}$$

Where, Si = Score obtained f<sub>i</sub> – frequency, N = total observations

**4.8 Schematic framework of research methodology**



**Figure 6:** Schematic framework of reserch methodology

## 5. RESULTS AND DISCUSSION

### 5.1 Socio-economics status and determinant

#### 5.1.1 Gender distribution

In the study area comprising Kavrepalanchok and Nuwakot, out of the total 70 respondents, 41 were male, while 29 were female. This distribution clearly indicates a higher participation of males in the field of Cocoon production, highlighting the greater involvement of male respondents in farming activities (as depicted in Table 3).

The chi-square statistic of 6.411 is the result of a chi-square test for association or independence between two categorical variables, namely, "Place of Residence" and "Gender of Respondents." Specifically, it tests whether there is a significant relationship between where respondents live (place of residence) and their gender.

The p-value is 0.011, which is less than the typical significance level of 0.05. This indicates that the chi-square statistic of 6.411 is statistically significant at the 0.05 level, suggesting that there is a meaningful association between place of residence and gender among the respondents. In practical terms, this means that the distribution of respondents across different places of residence is not the same for males and females, and the association is statistically supported.

Table 3: Distribution of respondents associated with cocoon production based on sex in Kavrepalanchok and Nuwakot district of Nepal					
Place where respondent live	Gender	Frequency	%	Chi Square	P value
Namobuddha Municipality	Male	34	68.0	6.41	0.11
	Female	16	32.0		
	Total	50	100.0		
Myagang Rural Municipality	Male	7	35.0		
	Female	13	65.0		
	Total	20	100.0		

#### 5.1.2 Age distribution

Out of the 70 respondents, a significant 44 individuals in the age group between 30-60 years were located in Namobuddha Municipality, whereas this number was notably lower, at 19, in Myagang Municipality. The study also identified that only 7 individuals aged above 60 years were involved in farming activities, and there were no participants below 30 years of age (as detailed in Table 4). Primarily, individuals within the age range of 30-60 years were found to be actively engaged in cocoon production.

Table 2: Active Cocoon producing age group associated with cocoon production in Kavrepalanchok and Nuwakot District of Nepal				
Place where respondent live		Age	Frequency	Percent
Namobuddha Municipality		<30	0	0.0
		30-60	44	88.0
		>60	6	12.0
		Total	50	100.0
Myagang Rural Municipality		30-60	19	95.0
		>60	1	5.0
		Total	20	100.0

#### 5.1.3 Caste distribution

In the study area, there was a diverse representation of caste groups among the 70 respondents. The majority, accounting for 55.71% of the population, belonged to the Brahmin and Chhetri communities. Tamang constituted the second-largest group, making up 30% of the population. Dalits represented 8.57%, while Newars had a smaller presence, comprising 5.71% of the population (as illustrated in Figure 7). From these findings, it can be concluded that the practice of rearing silkworms and engaging in sericulture farming was primarily adopted by individuals from the Brahmin and Chhetri communities. However, it's worth noting that the Tamang community also demonstrated significant involvement in this agricultural activity.

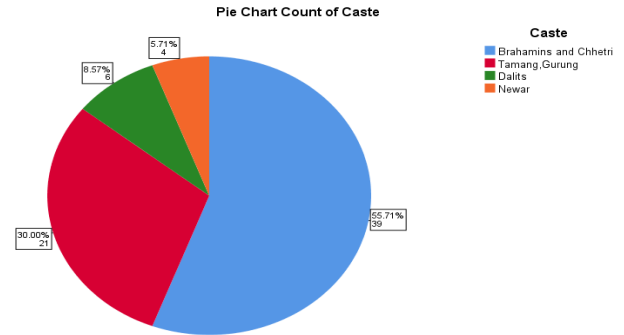


Figure 7: Castes distribution of respondent in Kavrepalanchok and Nuwakot Districts of Nepal

#### 5.1.4 Religion

The community in this region is occupied by 50% of Hindu religion. And 13% were Buddhist and apart from these there were 7% of the respondents.

Table 3: Distribution of respondents associated with cocoon production based on religion in Kavrepalanchok and Nuwakot district of Nepal		
Religion	Frequency	Percent
Hindu	50	71.4
Buddhist	13	18.6
Others	7	10.0
Total	70	100.0

#### 5.1.5 Family type

In the study area, the family structures were varied, with 31.43% of families being nuclear, while a substantial majority, approximately 68.57%, were joint families (as depicted in Figure 8). Interestingly, there was a clear preference for cocoon farming among joint families compared to nuclear families. This suggests that the practice of cocoon farming is more favored in joint family setups. It can be inferred that farmers prefer joint family structures because they facilitate the collective and collaborative undertaking of various activities, including cocoon farming.

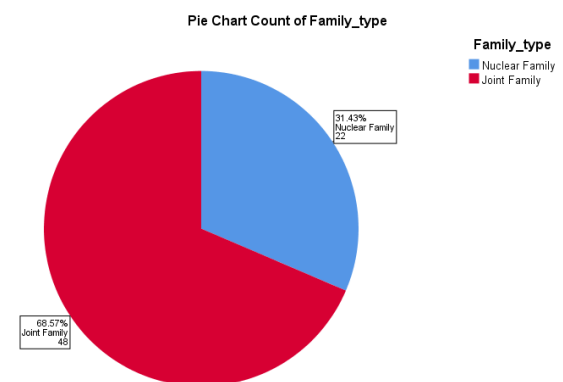


Figure 8: Family type of farmer involving in Cocoon production in Kavrepalanchok and Nuwakot Districts of Nepal

**5.1.6 Family size**

In the study, households were categorized into three groups based on family size using statistical tools such as mean and standard deviation. The results, as presented in Table 6, show that a significant portion of

households, specifically 52.9%, had family sizes ranging from three to eight members. Additionally, 15.7% of households had less than three members, while 31.4% had more than eight members in their family structure. These findings provide valuable insights into the distribution of family sizes within the study area.

Table 6: Distribution of the respondents based on family size in Kavrepalanchok and Nuwakot Districts of Nepal		
Size	Frequency	Percent
<3	11	15.7
3-8	37	52.9
>8	22	31.4
Total	70	100.0
Mean		5.8
Standard deviation		2.8
Range		1-12

**5.1.7 Education status**

The study's conclusion reveals that a majority of farmers engaged in Cocoon production were found to be illiterate, comprising 58.57% of the total. Additionally, 30% of farmers had primary-level education, while

secondary, intermediate, and higher-level education levels were represented at 4.29%, 4.29%, and 2.86%, respectively (as illustrated in Figure 9). These findings highlight the predominant presence of farmers with limited formal education in the field of Cocoon production. This shows the effect of educational status on the Cocoon productions.

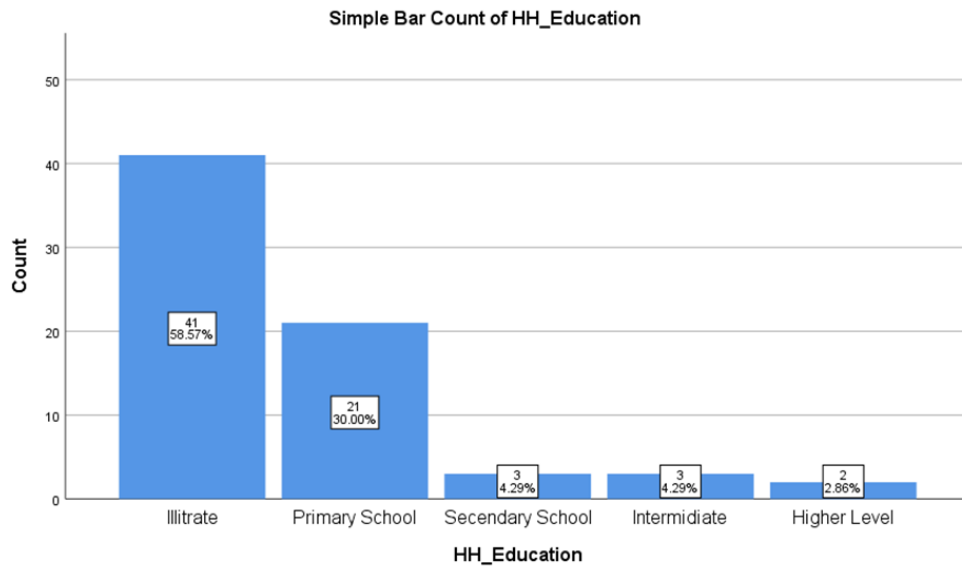


Figure 9: Education status of farmer involved in Cocoon production in Kavrepalanchok and Nuwakot Districts of Nepal

**5.1.8 Distribution of respondents based on source of income**

Figure 10 provides a clear depiction of the primary source of income in the surveyed area, with agriculture being the dominant source at 94.29%, followed by Employee and business at 5.71%. This data underscores the

significant reliance of the local population on agriculture as their main source of income. While there may be some household members engaged in service and business activities, agriculture remains the cornerstone of the local economy.

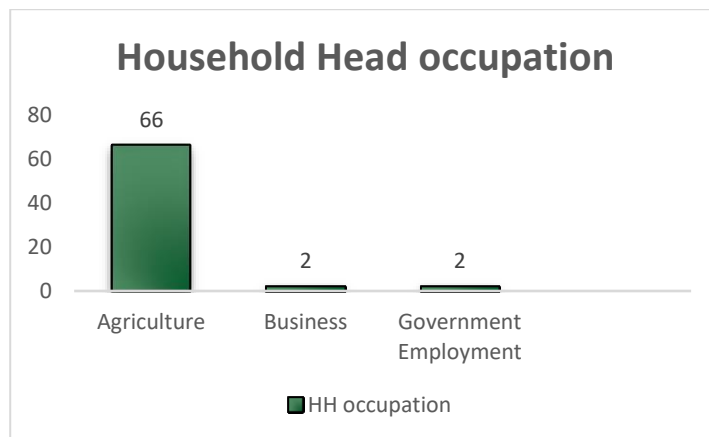


Figure 10: Distribution of respondents based on major source of income in Kavrepalanchok and Nuwakot Districts of Nepal

## 5.2 Farm characteristics of the study area

### 5.2.1 Land holding status of respondent

In the study, respondents were categorized into three groups based on landholding size using statistical tools like mean and standard deviation, as outlined in the table below. Table 7 reveals that a significant majority, over two-thirds of the respondents (65.7%), owned land in the range of 5-15 ropani. Additionally, 12.9% of respondents owned less than 0.5 Ropani of land, while 21.4% possessed more than 15 Ropani of land. The study's average landholding size for the area was calculated at 10.114 Ropani. It's worth noting that larger family sizes were associated with larger landholding sizes among the farmers in the study, indicating a positive correlation.

Land holding size (Ropani)	Frequency	Percent
<5	9	12.9
5-15	46	65.7
>15	15	21.4
Total	70	100.0
Mean		10.1
Standard deviation		4.7
Range		2-20

### 5.2.2 Response of the respondent about Cocoon production

Among the 70 respondents in the study, all respondents were identified as reliant on SDC for Silkworm Races. Presently, 32 species of Silkworm races are available for distribution to farmers. Sufficient races are accessible to farmers. All farmers possess their own land for this enterprise; however, none have conducted a soil test. Storage for cocoons is currently unavailable.

Description	Response	Frequency	Percentage
Silkworm Races	SDC	70	100
Sufficient Silkworm	Yes	70	100
Having own land	Yes	70	100
Having store facilities	No	70	100

### 5.2.3 Income from Cocoon production

Among the 70 respondents engaged in Cocoon production, it was observed that 35.7% of farmers fell within the income range of Rs. 20,000-50,000. A substantial 51.6% of farmers reported incomes ranging from Rs. 51,000-100,000, while 12.7% fell in the income bracket of Rs. 101,000-200,000 (as detailed in Table 9). As a result, it can be concluded that the majority of farmers in the study area generated income from Cocoon production within the range of Rs. 50,000-100,000.

Income (Rs. Thousand)	Frequency	Percentage
20-50	25	35.7
51-100	36	51.6
101-200	9	12.7
Total	70	100

### 5.2.4 Production and Income from Cocoon

Among 70 respondents, the average production was observed 137 kg that ranges from 45 to 270 Kg in a year. The total productive trees were ranges from 900 to 9000 and the mean observed was 4048 so with these the average income was noticed NRs. 68821.

Parameters	N	Min.	Max.	Mean	SD
Total production 2079 BS (Kg)	70	45	270	137.64	53.89
Total mulberry productive trees	70	900	9000	4048.57	2137.16
Total Income from cocoon	70	22500	135000	68821.42	26948.42

Min= Minimum; Max.=Maximum; SD=Standard

### 5.2.5 Amount of Cocoon produced/sold

Farmers in Nuwakot and Kavrepalanchok district sold Cocoon minimum 45 kg and sold maximum up to 27 kg (Table 11). In the study area amount of Cocoon that was produced were all sold due to less quantity and high demand.

Variable s	Observati on	Minimu m	Maximu m	Mean	Std. deviatio n
Producti on (kg)	70	45	270	137.64	53.89
Amount sell(kg)	70	45	270	137.64	53.89

### 5.2.6 Benefit cost analysis

Successful Cocoon production is a complex process that demands various inputs, coupled with meticulous care and management. Key cost factors in cocoon production encompass numerous aspects like field preparation, the use of improved planting materials, farmyard manure application, and the employment of sufficient labor for various intercultural operations. These cost elements collectively contribute to the total variable cost. The cost of production plays a pivotal role in determining the profitability of the venture and reflects the efficiency of the inputs employed by farmers.

In the study area, human labor emerged as a significant component among all variable expenses and was quantified in terms of man-days. Human labor was indispensable for a range of tasks including pit digging, land preparation, planting, weeding, training, pruning, harvesting, cleaning, grading, packaging, and storage, among others. It's worth noting that traditional cultivation methods still prevail in the study area, resulting in labor-intensive Mulberry Plant cultivation practices. The primary type of organic manure utilized in the study area was farmyard manure, and pesticide usage was limited to addressing severe pest problems. Given that production cost significantly impacts profitability, the average cost of Cocoon production per year was computed, taking into account the average Cocoon production within the study area. The study found that the average cocoon production per harvest was 45.88 kg annually, resulting in an average yearly production of 137.64 kg. This information provides valuable insights into the economics of cocoon production within the study area.

The study unveiled that the total variable cost for cocoon production in a year, with a production volume of 137.664 kg, amounted to Rs. 37,383.47. and, the average cost of farmyard manure (FYM) was determined to be Rs. 13,700, while the expenses for Urea, Potash, and DAP were estimated at Rs. 5,109.97, Rs. 980, and Rs. 1,839.50, respectively. The average labor cost was calculated at Rs. 7,578. This finding emphasizes that labor constituted a significant portion of the overall costs, as the expenses for plant materials were distributed over the years of the plant's lifespan in Cocoon production. Further details regarding the average costs of Cocoon production are presented in Table 13, providing a comprehensive overview of the economic aspects of Cocoon production in the study area.

S.N.	Particulars	Unit	Quantity	Rate	Amount
<b>Average Variable cost for producing 135 kg /Years (NRs)</b>					
1	Plant no.	No.	4088	2	8176
2	FYM	Doko	137	100	13700

**Table 10 (cont):** Benefit cost analysis of cocoon production in Kavrepalancok and Nuwakot Districts of Nepal

3	Urea	Kg	61.3	83.3	5110
4	Potash	Kg	24.5	40	980
6	Labor cost (Ploughing, weeding, Fertilizer, pruning application, etc.)	Man Day	4.21	600	7578
Total average Variable Cost					NRs 37383.4

S.N	Particulars	Age	Cost	Salvage cost	Depreciated amounts
<b>Average Fixed Cost per years</b>					
1.	Building	25	200000	20000	7057
2.	Rack	25	50000	5000	1800
3.	Mabushi	5	2000	000	400
Total Average Fixed Cost					NRs 9257
Total Cost = TFC+TVC					NRs 46640.47

The study's findings indicated that the returns generated from Cocoon production were substantial. The total returns from Cocoon production in one year amounted to approximately Rs. 68,820, based on an average Cocoon price of Rs. 500 per kilogram.

The gross margin, which is calculated as Gross Returns minus Total Variable Cost, can be computed as follows:

$$\begin{aligned} \text{Gross Margin} &= \text{Gross Returns} - \text{Total Variable Cost} \\ &= \text{Rs. } 68,820 - \text{Rs. } 37,383.47 \\ &= \text{NRs. } 31,436.53 \text{ per } 45.88 \text{ kg} \end{aligned}$$

Additionally, the Benefit-Cost Ratio (BCR) was determined by dividing Gross Returns by Total Cost:

$$\begin{aligned} \text{BCR} &= \text{Gross Returns} / \text{Total Cost} \\ &= \text{Rs. } 68,820 / \text{Rs. } 46,640.47 \\ &= 1.47 \end{aligned}$$

Cost items	Amount (RS)
Total variable cost (Rs.\137 Kg)	37,383.47
Total cost (Rs/137 Kg)	46,640.47
Average price of fresh Cocoon (Rs/kg)	500
Gross returns (Rs.)	68,820
Gross margin (Rs.)	31436.53
Benefit-cost ratio (B:C)	1.47

With a positive gross margin and a BCR greater than one, in this case, 1.47, it indicates that for every rupee invested, the business can yield returns of Rs. 1.47. This signifies that the investment is financially viable, and the business has the potential to operate smoothly, making it a favorable venture.

### 5.2.7 Production Function Analysis

Out of seven explanatory variables estimated in Cobb Douglas production function model five variables namely: Mulberry plants, FYM, labor costs, Building cost, Rack was found to be significant at 1%; 5% and 10% significance level. The coefficient of multiple determinations, R<sup>2</sup> was 0.5044 and which indicate that the explanatory variables included in the Cobb Douglas production function model explained 50% of the variation in cocoon production.

As regression result shown in the (Table 13), the coefficient of Mulberry Plants used found to be positive and significant at 10% level which indicated that 1% increase in Plants Numbers increases quantity of cocoon production by 0.157 %. Similarly, Quantity of labor used coefficient was positive and statistically significant in study result conducted by (Kumaresan et.,al 2005). Coefficient of FYM in year found to be positive and significant at 10% level which showed that 1% increase in experience increases quantity of cocoon produced by 0.3086 % of enterprises. also, coefficient of rearing structure found to be positive and significant at 5% level which indicated that 1% increases in use of polythene bags increases quantity of cocoon produced by 2.117% of enterprises, keeping other factors constant. Sericulture technology coefficients also found to be positive and significant at 1% level which revealed that 1% increase in technology frequency increased quantity of cocoon produced by 0.179% of enterprise, keeping other factors constant.

**Table 11:** Estimated values of coefficients of Cobb-Douglas production function associated with cocoon production

Explanatory Variables	P value	Coefficient	Standard Error	t value
Mulberry Plant	0.059	0.157*	0.063	0.015
FYM	0.061	0.308*	0.079	3.870
Labor	0.00	0.126***	0.037	0.014
Rearing Structure	0.076	2.117*	0.871	0.017
Technology	0.044	0.179**	0.119	4.94
Constants		0.61		
R <sup>2</sup>		0.5549		
Adjusted R <sup>2</sup>		0.5044		

\*\*\* = significant at 1%; \*\* = significant at 5%; \* = significant at 10% No star = No significant

### 5.2.8 Return to scale analysis

The sum of regression coefficient obtained from CDPF was found to be 2.887, which indicating increasing return to scale to cocoon production. This implies that an increase in the cost of variable inputs would return higher amount of income from cocoon production.

### 5.2.9 Resources use efficiency of Cocoon production

The present resources use efficiency analysis showed that the major inputs used in cocoon production such as Plant saplings, FYM, and Labors were underutilized and need to increase by 88.96, 81.61 and 88.09% respectively for optimum allocations. It also revealed that Rearing structure are overutilized and its cost should be decreased for optimum allocations.

The ratio of MVP (Marginal Value Products) to MFC (Marginal Factor Costs) was less than unity for only Rearing structure It indicate there is no need for the adjustment of MVP for all resources except Rearing structure for optimum uses.

**Table 12:** Resources Use Efficiency associated with Cocoon production with respect to Cobb Dauglas Production Function

Explanatory Variables	Geometric Mean	Coefficient	MVP	MFC	r (efficiency) ratio	Efficiency	D Value
Mulberry Plant	7029.047	0.157	9.06	1	9.06	Under-utilized	88.96
FYM	11703.36	0.308	5.44	1	5.44	Under-utilized	81.61
Labor	7586.83	0.126	8.40	1	8.40	Under-utilized	88.09
Rearing Structure	200000	2.117	0.31	1	0.31	Over-utilized	222

\*\*\* = significant at 1%; \*\* = significant at 5%; \* = significant at 10%

### 5.3 Description and extension related factors

The extension related factors described in this study were training (related to cocoon production) and frequency of extension agent contact.

#### 5.3.1 Training pattern

Figure reveals that only 87.14 % respondents had received training on cocoon production, while minority of the respondents (12.86%) had not received training. The farmers who were involved in the farmers' group and have good contact with the extension workers and SDC had access to such trainings and the other farmers didn't have access to such trainings. The farmers who were not involved in trainings didn't know about the modern technologies as their contact with other farmers was low and they weren't familiar the technique of Rearing.

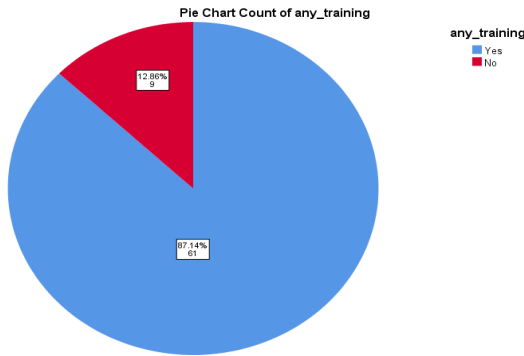


Figure 11: Distribution of respondents based on training pattern in Kavre and Nuwakot Districts

#### 5.3.2 Extension material availability

In the study area extension material was moderately available (18.33%), only few were (7.67%) getting easily while (75%) people cannot get the extension material (Figure 13). Extension material plays an important role in getting new information from different source. Farmers of Nuwakot were little backward in getting pamphlet, booklet, leaflet about the technology of Cocoon production. A group researchers concluded that extension agent can easily diffused agricultural technology through the utilization of individual contact methods such as farm visits, demonstration, home visits and office call (Levent Büyükuysal, 2019).

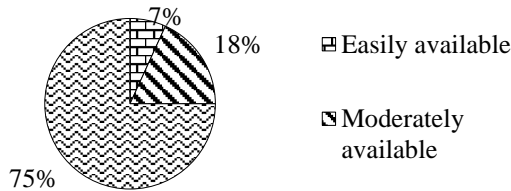


Figure 12: Extension material availability in Nuwakot and Kavrepalanchok Districts

### 5.4 Relation, Problems and prospects

#### 5.4.1 Age of Orchards

Among the 70 respondent of the study area most of the were involved in the farming having trees between 7-10 years were 62.85%, farmers who were involved in farming between 2-6 years were 8.5%, farmer who were involved in farming above 11 years were 28.64% (Table 15). It concluded that most of the farmer in study area were involved producing cocoon based on their remains trees and they are rarely reestablishing new orchards.

Duration in years	Frequency	Percent
2-6	6	8.50
7-10	44	62.85
Above 11	20	28.64
Total	70	100

#### 5.4.2 Fertilizer availability

Among the 70 respondents during farming only (8%) farmers had no difficulties in fertilizer, they were getting fertilizer easily, (10%) farmers were moderately getting the fertilizer while (82%) farmers had difficulties in the fertilizer (Figure 14) some researchers conclude that in boosting famers' yield, extension services ensure that the farmers should adapt judicial use of chemical fertilizers, soil preparation, protection measures along with improved races (Alamu, 2007).

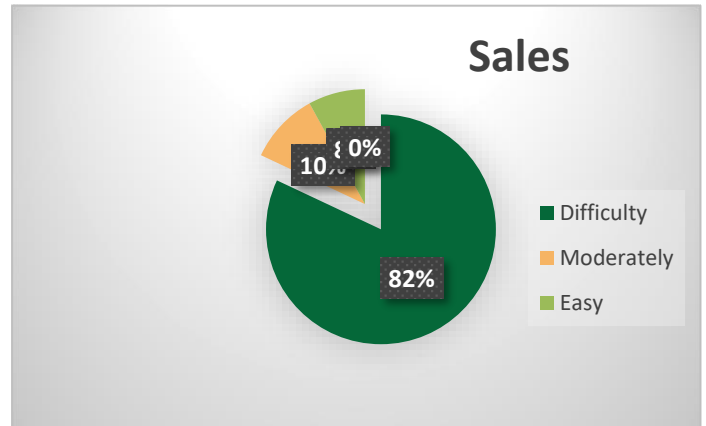


Figure 13: Fertilizer availability in Kavrepalanchok and Nuwakot Districts of Nepal

#### 5.4.3 The reason behind Cocoon production

Study shows that nearly three quarter (71.66%) respondents for income involved in Cocoon production, (20%) respondents because of future possibility and (8.33 %) of the respondent because of easy access doing Cocoon production (Table 16).

Reasons	Frequency	Percent
For income	53	71.66
Future possibility	12	20.00
Essay access	5	8.33
Total	60	100

#### 5.4.4 Means of technical assistance

In study area most of farmers (64.2%) consult their problem to the SDC. Frequent visit of the Officials to the village had made farmers more conscious about their problems and the way of solving. While some farmers consult their problems to the Company (14.2%), then and only (21.6%) consult to their neighbors (Table 17).

Means	Frequency	Percent
SDC	45	64.2
Company/Cooperatives	10	14.2
Neighbors	15	21.6
Total	70	100

#### 5.4.5 Marketing of the products

The study shows that (85.46%) farmers sell their products to the Kathmandu Based Company, (9%) sold it to local market that includes the collectors of the Nuwakot and Kavrepalanchok districts. (6%) sold their product sometimes at local market and sometimes at Kathmandu where they found good price and are accessible to them (Figure 15).

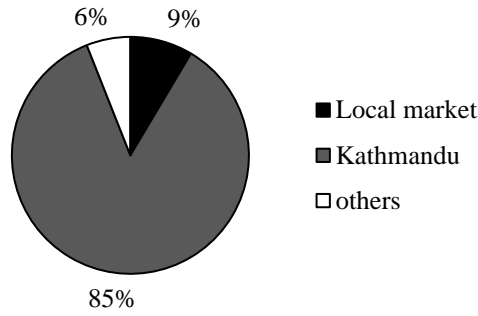


Figure 14: Marketing of Cocoon in Nuwakot and Kavrepalanchok Districts of Nepal

5.4.6 Mode of marketing

In the study area (80%) of the people sell their product directly without any involvement of middle man through making Groups, (18.33%) of the

farmers sell their product with the involvement of the middleman and only (1.67%) sell their product Directly (Figure 16) without any middleman contacts.

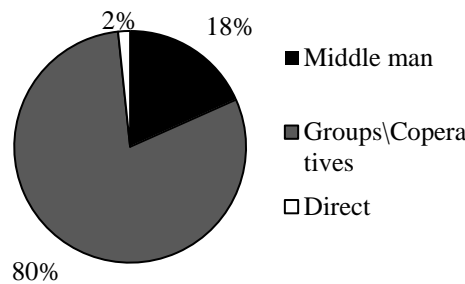


Figure 15: Mode of Marketing in Nuwakot and Kavrepalanchok Districts of Nepal

5.4.7 Problems in Cocoon production

The major constraints faced by the Cocoon Producer was year-round fixed price of cocoon in the market despite increasing trend of demand with index value 0.90 followed by Cutoff of subsidy by the government with index value 0.76, High silkworm mortality with index value 0.62, Disease

and peat with index value 0.55 and financial shortage with index value 0.3 respectively as shown in table 22. Higher index values for each constraint under marketing and financial constraints indicate farmers perceived marketing and financial problem to be the major constraints in Cocoon production.

Table 16: Problems associated with Cocoon production in Kavrepalanchok and Nuwakot Districts of Nepal

Preference criteria	Scores					Total weightage	Index	Rank
	1	0.8	0.6	0.4	0.2			
Disease and Pest	5	10	18	37	0	38.6	0.55	IV
High Silkworm mortality	4	14	40	12	0	44	0.62	III
Year-round fixed cocoon price	45	17	6	2	0	63	0.90	I
Financial shortage	4	4	2	12	48	22.8	0.32	V
Cutoff of Subsidy	12	41	10	7	0	53.6	0.76	II

5.4.8 Problems in Marketing of Cocoon production

The study shows 27 farmers problems in Cocoon production that emphasizes the Subsidy (Figure 17) lack of Subsidy leads to the decrease decrease of adoptability. Twenty-five farmers concluded problem in

market that is the price of the product remains same for a long period of time despite increase demands. Four farmers have problem in farming due to pest and disease, due to improper managements, while 4 farmers have problem in Awareness and Knowledge about rearing and development of quality Products

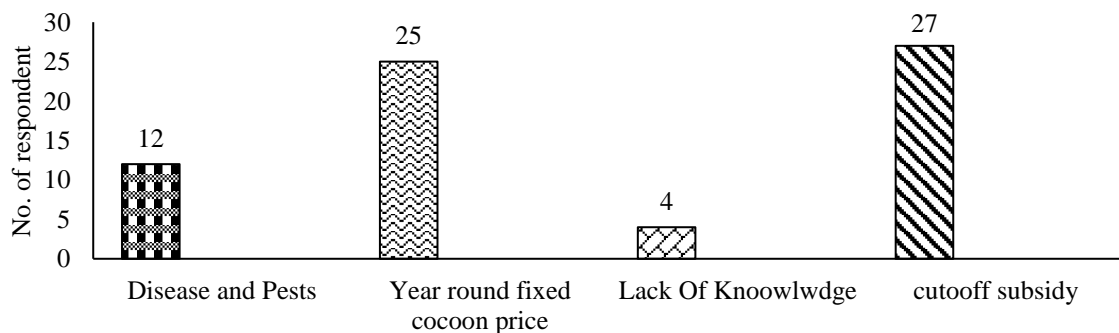


Figure 16: Problems associated with marketing in Cocoon production in Kavrepalanchok and Nuwakot Districts of Nepal

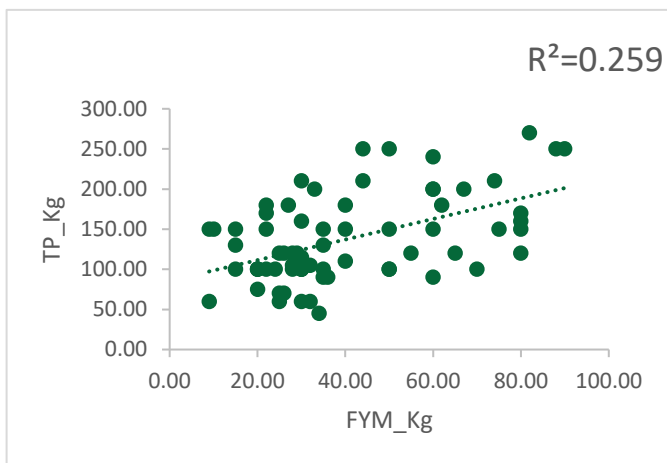
**5.5 Correlation between Production and variable**

The correlation coefficient (r) of 0.508. Since it's positive, it indicates a positive correlation between FYM and cocoon production. There is a moderate positive correlation (r = 0.508) between the use of FYM and cocoon production. This means that as FYM usage increases, cocoon production tends to increase, but the relationship is not perfect (r <1).

The R<sup>2</sup> linear value (Coefficient of Determination) of 0.258 means that approximately 25.8% of the variability in cocoon production can be explained by changes in FYM usage. This value indicates that FYM is a significant factor in explaining the variations in cocoon production. Other 74.2% in the yield is due to other variables.

Table 17: Correlation between total production of cocoon with FYM			
Variables		FYM (kg)	Total production (Kg)
FYM_kg	Pearson Correlation	1	.50**
	Sig. (2-tailed)		.00
	N	70	70
Total production (Kg)	Pearson Correlation	.50**	1
	Sig. (2-tailed)	.00	
	N	70	70

\*\* . Correlation is significant at the 0.01 level (2-tailed).



**Figure 17:** Correlation Chart

**6. SUMMARY**

Sericulture, the practice of cultivating silkworms for cocoon production, plays a vital role in the livelihoods of many Nepalese farmers. However, it is a field greatly influenced by the whims of nature and market fluctuations. As the demand for cocoons continues to rise, both nationally and internationally, farmers are increasingly looking to engage in commercial cocoon rearing. This study aimed to shed light on the socioeconomic status of farmers involved in cocoon production. We gathered primary data using purposive sampling, ensuring that the insights we present here are a true reflection of the local farmers' experiences and perspectives. In this chapter, we offer a concise summary of our findings and conclusions from the study, along with recommendations for further research in this field. It is our hope that this study contributes to a better understanding of the challenges and opportunities faced by those engaged in cocoon production in Nepal.

Our research was conducted in the Namobudhha Municipality and Myayang Rural Municipality, situated in Kavrepalanchok and Nuwakot, respectively. We randomly selected 70 respondents from these areas and conducted in-depth interviews and focus group discussions with the farmers in May 2023.

In descriptive statistic; percentage, range, mean, standard deviation, frequency etc. were used to interpret data. Chi-square test was used to measure the relationship between dependent and independent variables.

The survey area exhibited a gender distribution where males comprised the majority at 58.57%, while females accounted for 41.42%. Male household heads were predominant in the interviews, and a significant portion of them fell within the age group of 30-60 years. In terms of ethnicity, Brahmin and Chhetri constituted the largest group at 55.71%, followed by Tamang at 30%. Dalits represented 8.57%, and Newars made up 5.71% of the population. Religion-wise, the area was predominantly Hindu.

Families in the study area had an average size of 5.8 members, with most households consisting of 1-12 members. Regarding education, many respondents had limited or no formal education, while some had completed education levels below the School Leaving Certificate (SLC) and others had education beyond that level. Agriculture emerged as the dominant occupation for 95% of the population, and there was notable variation in landholding sizes, with an average landholding size of 10.11 Ropani. These demographic and socioeconomic characteristics provide valuable context for understanding the local dynamics and challenges related to cocoon production.

The respondents' income levels were distributed as follows: 35.7% fell within the income range of Rs. 20,000-50,000, while 51.6% reported incomes between Rs. 51,000-100,000, and 12.7% had incomes in the range of Rs. 101,000-200,000. The average cocoon production per year stood at 137.64 kg, with individual production quantities ranging from 45 kg to 270 kg annually. On average, the cocoon produced per harvest was 45.88 kg, given that this process occurred three times a year, resulting in an annual average production of 137.64 kg. The study also computed the total variable cost for cocoon production in a year with 137.664 kg at Rs. 37,383.47, along with fixed costs of NRs. 9,250. Consequently, the gross margin (GM) was calculated at NRs 31,436.53 per 45.88 kg, with a benefit-cost ratio (BCR) of 1.47.

Exploring factors related to extension services, it was found that 87.14% of respondents had received training, while 12.86% had not received any training. Concerning tree age in the farms, the majority of farmers, at 62.85%, had trees aged between 7-10 years, 8.5% had trees aged between 2-6 years, and 28.64% had trees older than 11 years. Among the 70 respondents, 8% reported having no difficulties in obtaining fertilizer, 10% faced moderate challenges in accessing it, and a significant 82% encountered difficulties in acquiring fertilizer. Approximately 75% of respondents noted that they did not have access to extension materials. These insights provide valuable information about the challenges and opportunities within the context of cocoon production in the study area.

The study reveals that the majority of respondents, about 71.66%, engage in cocoon production primarily to generate income, while 20% are motivated by future prospects, and 8.33% find it accessible and convenient. Notably, 64.2% of farmers seek assistance from the Sericulture Development Center (SDC) when they encounter challenges in their cocoon production efforts. When it comes to selling their products, a significant 85.46% of farmers prefer to sell to Kathmandu-based companies, with 9% choosing the local market as their outlet. In the marketplace, it's noteworthy that a substantial 80% of people sell their products directly, bypassing middlemen, while 18.33% involve middlemen in their sales transactions. Only a minimal 1.67% opt for direct sales.

The challenges faced in cocoon production include the discontinuation of subsidies, the persistence of unchanged product prices despite growing demand, issues related to pests and diseases, improper management practices, and a general lack of awareness among producers. These findings underscore the need for targeted support and interventions to enhance the sustainability and profitability of cocoon production in the region.

**7. CONCLUSION**

From the findings of the study, the following conclusions were drawn:

The study focusing on the socioeconomic status of cocoon production in Nuwakot and Kavrepalanchok underscores the significant potential of commercial cocoon production to enhance the community's socioeconomic well-being. This region possesses a notable comparative advantage in this regard. However, there are pressing challenges that demand attention, including the discontinuation of subsidies and persistently low market prices.

To augment their income from cocoon production within a specific area, farmers have turned to get rid of the constraints that come on the way. Sericulture stands out as a crucial income source for households in this study, many households also maintain additional sources of income. It's evident that numerous farmers mainly males involved in this practice in

the area face limitations in accessing information, market channel and adopting improved rearing practice. Addressing these issues can contribute to the sustainable growth of cocoon production and improve the livelihoods of the community. Storage Centre are not yet established. Involvement of male in agricultural activity was observed to be higher in

these Municipality whereas in reality there is more involvement of female. The study shows male dominance because male is house hold head so they involved in interview.

The older population were lower adopter of technology and weren't willing to continue this enterprises as the government cut the subsidy few years back and also the price for cocoon is low throughout the y. The farming households with 3-8 members and educated up to the level of SLC and above were adopter of technology. The farmers involved in the farmers' group had good contact with the extension personnel and also had participated in the various trainings related to cocoon rearing. They were the adopters of the technology than those who weren't involved in groups.

**SUGGESTIONS**

- Formation of the farmers' group in the rural areas of the municipality.
- Effective extension delivery system should be introduced by the government.

- Education of the farmers is also important in adoption so; the effective education system should be established and the educated ones should be encouraged in the farming sector.
- Credit facilities through banks, co-operatives should be made available so that Commercial adoption can be easily done by farmers.
- Good market and good price policy should be implemented.
- Good price policy of the products should be introduced and implemented.
- Various research bodies should be established to develop new and suitable races that are adaptable to Nepalese conditions, high yielding and have silk.

Concerned stakeholders should focus attention on crucial factors; such as the constraints identified by this study through concerted efforts while formulating development strategies and programmes for farmers in the study area.

**SWOT ANALYSIS**

Cocoon production and marketing in Kavrepalanchok district has following Strength, Weakness, Opportunities, and Threats.

<p><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>• Suitable climatic condition for sericulture and cocoon production</li> <li>• Effective market chain</li> <li>• Growing demand of cocoon</li> <li>• Two rearings (max 3) are realized in a year thus are good source income</li> <li>• Availability of technical support from relevant institutions as a subsidy, training, workshop.</li> <li>• Increasing demand in local, national as well as international markets.</li> <li>• Formation of Farmer's Group and co-operatives for better production</li> <li>• Handmade silk products</li> </ul>	<p><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>• Inadequate market information</li> <li>• Inadequate post handling knowledge</li> <li>• Inadequate storage facilities</li> <li>• Limited competition, thus weak bargaining position for farmers</li> <li>• Lack of technical knowhow, marketing knowledge and marketing extension services</li> <li>• Same price for long peroid of time</li> <li>• Improper aand irregular subsidy distrubution</li> <li>• Variation in silkworm quality.</li> <li>• Decreased level of productivity.</li> <li>• Inadequate out-reach and follow-up of extension programmes.</li> <li>• Less availability of expertise in marketing.</li> </ul>
<p><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>• Employment opportunity</li> <li>• Growing market demand</li> <li>• Increase of competitiveness with the development of cooperatives and women groups</li> <li>• Use of inputs and technology can result in increased yield</li> <li>• Don't need separate land in large scale</li> <li>• Availability of markets for selling fresh ccocoons</li> </ul>	<p><b>THREATS</b></p> <ul style="list-style-type: none"> <li>• Disease and pest problems</li> <li>• Lower profit for farmers</li> <li>• The lack of interest of young workers in agricultural sectors</li> <li>• Inadequate information on marketing</li> <li>• Increasing cost of input</li> <li>• Lack of coordination between production and marketing sector</li> <li>• Institutional left over</li> <li>• Uncertified silk being sold in market.</li> </ul>

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