

ADOPTION BEHAVIOUR OF SERICULTURISTS A MULTIVARIATE ANALYSIS

By

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THESIS

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1994

DECLARATION

I hereby declare that this thesis entitled "Adoption Behaviour of Sericulturists - A Multivariate Analysis" is a bonafide record of research work done by me during the course of research and that this has not previously formed the basis for the award to me of any degree diploma associateship fellowship or other similar title of any University or Society

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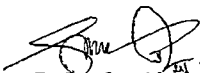
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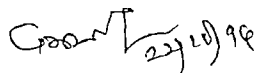
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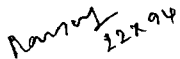
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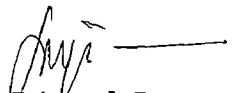

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Introduction

INTRODUCTION

Alleviating poverty and reducing inequalities by providing employment opportunities to the rural poor has always been an important objective of planning in India. After Independence, the Government of India launched many transfer of technology programmes for the development of agricultural and allied sectors. But amidst the impressive figures of growth and productivity, more than 40 per cent of the population - mostly rural dwellers - is still below the poverty line. There is acute unemployment and high percentage of illiteracy at the rural level.

According to Chowdhury and Singh (1992) in a country like India, where more than 70 per cent of the population sustains the livelihood from agriculture and majority of the population submerged in poverty, rapid growth of production would not be the sole determinant of development. What is desired most is growth with equity. In India the twin objectives of growth and equity are being sought through Integrated Rural Development Programmes creating employment potentials in agriculture and agro-based industrial sectors. It is true that advancement of rural masses especially rural women is possible only when they are provided with gainful employment opportunities.

Sericulture is such an enterprise, which helps in the path of growth with equity (Chelladurai, 1991) It provides lot of employment opportunity for rural women and youth Patil and Kalayankar (1993) reported that, sericulture provided employment to about 5.5 million people in rural areas and earned foreign exchange worth Rs 675 crores during 1991-92 It is a labour intensive activity that rightly fits into the socio-economic structure of rural areas

Sericulture is an agro-based industry involving cultivation of mulberry, rearing of silkworms and post cocoon processes Of late, sericulture has become one of the important rural industries Cultivation of mulberry and rearing of silkworm are the two distinct activities carried out at the farmer's level In India eventhough Karnataka accounts for the lion's share of country's mulberry silk production (Lakshmanan and Thiagarajan, 1991) sericulture is being popularised to almost all the states The inherent advantages such as low investment, minimum gestation period, multiple returns, high employment potential etc are making sericulture an effective tool for rural development In India, the mulberry area and raw silk production had increased from 1.7 lakh hectares and 4593 tonnes during 1980-81 to 3.28 lakh hectares and 10,657 tonnes in 1991-92 (Rao and Kumar 1993)

In Kerala, sericulture was introduced during 1960s in some parts of Wynad for the benefit of the economically weaker sections of the people, which could not make any impact. However, the second attempt during 1986 came out with encouraging results and increased the confidence of the farmers (Sudhakaran and Nagaraj, 1989). Since then as the potential for the development of sericulture in the state has been found very high, there has been serious efforts by the State Government in association with the Central Silk Board (CSB) to popularise sericulture to other districts also.

During 1990-91, State Government had started the Sericulture Development Project under Kerala Khadi and Village Industries Board (KVIB) to promote sericulture as a source of gainful employment for rural masses and to boost the rural economy. Palakkad and Thrissur are two major districts where sericulture had been widely accepted by the farmers. From the records maintained by KVIB it was found that Palakkad district is having a mulberry area of 577 acres with 466 silkworm rearers, the figures for Thrissur district being 248 acres and 234 rearers, respectively.

Sericulture extension system has been established to provide practical and useful information to sericulturists to solve their problems. They also aim at dissemination of improved technology among the farmers. Despite the

concentrated and consistent effort by the extension workers there exists wide gap between the recommended technology and actual adoption by farmers. Benchamin (1993) reported that in Karnataka the leaf yield under field conditions was only 43 per cent and 47.4 per cent of the potential under rainfed and irrigated conditions, respectively. The yield of cocoon under farmer's conditions was roughly 68 per cent of the potential yield. He attributed this yield gap to the limited or partial diffusion of various components of the improved technology.

The package of improved practices is a progressive idea that breaks away from the traditional ways (Malone 1966). In sericulture, the package of improved practices formulated on the basis of extensive researches by Central Silk Board (CSB) are being disseminated among the sericulturists of Kerala also. Most farmers adopt a few or some of the practices in the package. In mulberry cultivation and silkworm rearing the farmers have twin goals: good yield and good profit. The package of improved practices provides a comparatively simple way by which the sericulturists can make substantial gain in yield.

The studies conducted in Karnataka by Prakashkumar (1986), Shivaraja (1986), Aswathanarayana (1989), Satheesh (1990), Gopala (1991), Dollu et al (1993) and Singhvi et al (1993) had shown that in spite of the efforts made by the

State and Central Governments for transfer of sericulture technology, the complete package is yet to be adopted in full by the sericulturists. However, no systematic investigation has been conducted so far to study the extent of adoption of sericulture technology in Kerala. In this context the present study was taken up which aimed to study the knowledge level, cultivation pattern and extent of adoption of improved practices by sericulturists of Palakkad and Thrissur districts in Kerala. Sericulture being a comparatively new venture in Kerala, an analysis of the adoption pattern will provide necessary insight for planning and organising further research and effective extension strategies.

The socio, economic and personal characteristics of the farmers also influence their adoption behaviour. They may act as promoters or inhibitors of technology adoption. These deciding factors also are to be identified and studied, the results of which can be utilised for better planning and implementation of the programmes related to the sericulture enterprise.

Unlike a traditional agricultural crop, the adoption of an innovative technology requires proper motivation of the clientele. The role of motivational agents in adoption of innovation is unquestionable. An understanding about the factors which motivated the sericulturists to take up this

enterprise, and the agents who had motivated them during the adoption process, will be useful in promoting the enterprise among prospective farmers

Considering all the advantages of sericulture enterprise, one cannot expect this to be free from any problem or limitation. It is a fact that there are many who have the potential for the adoption of sericulture but not yet taken up. This undoubtedly indicates the existence of limitations and constraints in the field of sericulture.

Hence the study also attempts to make an analysis of the motivational factors, motivational agents and constraints in the adoption of sericulture by the adopters and reasons for non-adoption by prospective adopters. The findings would help the authorities and policy makers to plan and modify strategies for popularisation of sericulture. The results of the study would also highlight the developments required in the field of sericulture so that the constraints are reduced to the maximum extent possible.

The study has been thus designed with the following specific objectives,

1. To study the extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by sericulturists

- 2 To identify the knowledge gap of sericulturists with respect to recommended practices
- 3 To find out the influence of selected socio, economic and personal characteristics of the farmers on the extent of adoption and knowledge level
- 4 To identify the factors motivating the adoption of sericulture technology
- 5 To analyse the constraints in the adoption of sericulture
- 6 To search out the reasons for non-adoption by prospective sericulturists

Limitations of the study

The present research forms a part of the post graduate programme, which is a single student investigation and hence has the inherent limitations in terms of time money and other resources. Because of this important limitation the study was confined to two selected districts and restricted sample size. However, care has been taken to make the study as objective and systematic as possible. Since the study was confined to only two districts, there may be limitations in making generalisations to other areas. Nevertheless it is expected that the findings of this study would definitely

throw light on the adoption pattern of sericulture technology and its associated factors and pave the way for planning an appropriate promotion strategy

Presentation of the thesis

The thesis is divided into five chapters including the present one. The present chapter already covered the scope, objectives and limitation of the study. The second chapter deals with review of literature relevant to the study. The details of study area, selection of respondents, selection and measurement of variables, tools for data collection and statistical techniques used for analysis are covered in the third chapter. Methodology. The fourth chapter deals with the results of the study and discussion of the results. The last and final chapter presents the summary and implications of the study. The references, appendices and abstract of the thesis are given at the end.

Review of Literature

CHAPTER II

REVIEW OF LITERATURE

A review of previous works, either theoretical or empirical, may assist in the delineation of new problem areas and may provide a basis for developing a theoretical framework for the study. This in turn may also help in operationalising the variables enabling the observation and measurement of the topic under investigation. Based on the objectives of the study the review of literature is furnished under the following heads

- 2.1 Adoption of recommended practices in sericulture by sericulturists
- 2.2 Knowledge level of sericulturists with respect to recommended practices in sericulture
- 2.3 Relationship of selected socio economic and personal characteristics of sericulturists with their extent of adoption and knowledge level
- 2.4 Factors motivating the adoption of sericulture
- 2.5 Constraints in the adoption of sericulture
- 2.6 Reasons for non-adoption of sericulture
- 2.7 Conceptual framework for the study

2.1 Adoption of recommended practices in sericulture by sericulturists

Sericulture being a comparatively new enterprise in Kerala, studies on sericulture farmers are not available. Therefore, some of the adoption studies pertinent to the present investigation from other states especially from the traditional sericulture states like Karnataka, Tamil Nadu etc are reviewed and presented.

Puttaswamy et al (1978) observed that only 21 per cent of the sericulture farmers were rearing silkworms in separate building. It was also reported that majority of the farmers had adopted control measures against muscardine disease while it was very few in case of grasserie and none in case of pebrine' and flacherie'.

Rajashekaraiah (1979) reported that adoption of selected recommended practices of silkworm rearing was higher among big farmers than small farmers. However it was noted that almost all farmers had brought layings from the recommended source and had adopted recommended race of silkworm, type of leaves to be fed, and leaf preservation measures.

In a study to find out the adoption of sericulture technology by trained and untrained sericulturists in

Tamil Nadu, Thangaraju (1979) reported that all the recommended practices in general were adopted by more than 3/4th of the trained sericulturists above 75-100 per cent of recommended level. Variety, fertilizer, plant protection and pruning were adopted by untrained sericulturists to a lesser extent only. Almost two-third of the farmers belonged to medium adoption category irrespective of training participation.

Thangaraju and Knight (1980) pointed out that more than 90 per cent of the trained sericulturists followed the correct spacing, used recommended number of trays and adopted disease control measures.

Shivaraja (1986) concluded after his study on adoption behaviour of Bivoltine seed cocoon producers that majority of big farmers were high adopters while it was quite reverse in case of small and marginal farmers. There was no significant difference in the overall adoption of recommended practices of mulberry cultivation and silkworm rearing by big, small and tenant farmers as revealed by Prakashkumar (1986).

Aswathanarayana (1989) grouped majority of sericulture farmers into medium and high adoption categories in respect of package of practices recommendations including silkworm race source of laying chawki rearing practices, rearing home

environmental requirements, leaf quality, quantity and preservation practices, spacing of worms, bed cleaning, moulting, disease control, mounting and harvesting practices

Satheesh (1990) reported that chawki rearing practices such as appropriate race, type of leaf, leaf preservation and disinfection were followed by majority of farmers

Sericulturists in developed and less developed areas were found significantly different in terms of their extent of adoption of recommended mulberry cultivation and silkworm rearing practices (Gopala, 1991) Taking the different practices separately, the difference was found non-significant with respect to manures, fertilizers, irrigation and race of silkworm while the difference was found significant in all the other recommended practices

Generally the recommended practices in silkworm rearing were adopted more by large farmers than small and tenant farmers and most of the farmers irrespective of size were not applying the recommended dose of fertilizers to mulberry crop (Gowda et al , 1992) Benchamin (1993) based on an analysis of the rate of adoption of improved technology by sericulturists reported a limited or partial diffusion for most of the components of improved technology

Dolli et al (1993) reported that most of the practices were adopted partially by the sericulturists. The simple practices like spacing of mulberry plants and bed cleaning were adopted by majority of farmers where as variety of mulberry fertilizer, plant protection chemicals incubation care and chopping method were not adopted by many. Other practices like application of FYM disinfection bed disinfection and spacing of worms were only partially adopted.

Singhvi et al (1993) indicated that great majority of farmers reared worms in rearing-cum-dwelling houses as well resorted to adoption of partial disinfection measures. Nearly 50 per cent of farmers applied FYM and used bed disinfectants in the recommended way. The adoption levels for fertilizer application, plant protection measures, temperature and humidity regulations, bed cleaning using net and pebrine disease control measures was low.

2.2 Knowledge level of sericulturists with respect to recommended practices in sericulture

Knowledge is the pre-requisite for adoption of any innovation. With this view many workers had tried to study the knowledge of sericulture farmers about the recommended practices. Studies on knowledge of sericulture farmers are reviewed in this section.

Rajashekaraiah (1979) reported that 78 per cent of farmers had medium knowledge level on improved sericultural practices while remaining 22 per cent were equally shared by high and low knowledge categories. As reported by Shivaraja (1986), the knowledge level of sericulturists had positive significant relationship with the adoption of recommended practices in bivoltine seed cocoon rearing.

Aswathanarayana (1989) found that majority of farmers had medium to high overall knowledge. Satheesh (1990) reported that majority of the beneficiary farmers of chawki rearing centres had knowledge of chawki rearing practices such as appropriate race rearing place, diseases, disinfection and leaf preservation, but most of them lacked knowledge of practices like bed cleaning by net and black box method of hatching eggs. At the same time, majority of the non-beneficiaries had knowledge about leaf preservation, cleaning the bed, identifying diseases and selection of race, even though not aware of the size of cleaning net, maintenance of separate mulberry garden and area of chawki room.

Gowda et al (1992) reported that sericulturists had only very low knowledge with respect to worm spacing, number of feeds and types of leaves to be fed.

Singhvi et al (1993) reported that level of awareness of the farmers about some of the crucial sericultural practices namely fertilizer application, plant protection measures, bed cleaning by net and pebrine disease control were low at 30 40 per cent Nearly 50 per cent of respondents were aware of leaf transportation practices as well as optimum temperature and humidity regulation in rearing rooms Except the aforesaid practices, almost all the sericulturists were aware of other recommended practices in mulberry cultivation and silkworm rearing

2.3 Relationship of selected characteristics of sericulturists with the extent of adoption and knowledge level

The same technology may not find equal application or equal adoption even in a given area This may be due to the fact that within a client system there might be financial or informational inequality and differences in attitudes perceptions, traditional or economic orientations etc There are other factors too in the client system such as social psychological and infrastructural factors which may inhibit or promote the adoption process (Gupta 1989) In the case of sericulture also, these factors vary among the adopters and influence their extent of adoption and knowledge level The earlier studies which tried to find out the relationship

between the characteristics of farmers and their extent of adoption and knowledge level are reviewed as under

2.3.1 Area under mulberry cultivation

Satheesh (1990) reported positive significant relationship between area under mulberry cultivation and extent of adoption of recommended chawki rearing practices

Gopala (1991) also reported positive significant relationship between area under mulberry cultivation and extent of adoption of recommended sericultural practices

Based on the above reviews positive significant relationship is expected between area under mulberry cultivation and extent of adoption

Satheesh (1990) reported positive significant relationship between area under mulberry cultivation and knowledge level of chawki rearers. Based on this study positive relationship between area under mulberry and knowledge level is anticipated in the present study

2.3.2 Education level

Thangaraju (1979) and Prakashkumar (1986) reported positive significant relationship between education level and extent of adoption of sericultural practices. The

relationship between education level and adoption of recommended practices was found to be positive and highly significant in the studies of Aswathanarayana (1989) and Satheesh (1990) with regard to silkworm rearing practices and chawki rearing practices, respectively Gopala (1991) also reported significant relationship between the two variables

Based on the above reviews positive significant relationship between education level and extent of adoption is anticipated in the present study

Aswathanarayana (1989) reported positive significant relationship between education level and knowledge of farmers about silkworm rearing A similar trend was reported by Satheesh (1990) between education level and knowledge about chawki rearing practices

Hence in the present study also, positive relationship is expected between education level and knowledge about recommended practices

2 3 3 Family size

The researcher could not locate any study relating family size with either extent of adoption of sericulture or knowledge about recommended practices in sericulture Hence available related studies in other areas were reviewed and the

relationship established between family size and extent of adoption of technologies were as follows

Author (year) -----	Relationship -----	Field of study -----
Tyagi and Sohal (1984)	Non significant relationship	Dairy innovation
Agarwal and Arora (1989)		Gobargas plant
Reddy (1991)	Non significant	Cotton seed growers

The above studies had established non-significant relationship between family size and extent of adoption. But family size was believed to be an important determinant in the adoption of sericulture as sericulture is known to be a family enterprise.

It is postulated that there would be positive significant relationship between family size and extent of adoption and knowledge about recommended practices.

2 3 4 Occupation

Studies showing the relationship of occupation with extent of adoption and knowledge level of sericulturists were found lacking. Hence some related studies are reviewed and the relationship established between occupation and adoption of respective technologies was as follows.

Author (year)	Relationship	Field of study
Jayakrishnan (1984)	Positive significant relationship	Low cost technology in paddy
Rathinasabapathy (1987)	Non-significant relationship	Integrated pest management in cotton
Krishnamoorthy (1988)	Non-significant relationship	Irrigated cotton and millets

The studies cited above do not give any clear direction about the relationship. Hence it will be useful to study the relationship between occupation and extent of adoption of sericultural practices.

It is postulated that an occupational orientation towards agriculture would have positive relationship with extent of adoption.

Jayakrishnan (1984) reported positive significant relationship between occupation and knowledge about low cost technology in paddy.

It is postulated that occupational orientation towards agriculture would have positive relationship with knowledge about recommended practices in sericulture.

2 3 5 Landholding

Studies by Thangaraju (1979) and Prakashkumar (1986)

had established positive relationship between land holding and extent of adoption in sericulture. However the relationship was found non-significant by Aswathanarayana (1989) in the case of adoption of silkworm rearing practices. Satheesh (1990) and Gopala (1991) reported significant relationship between the two variables.

Based on the reviews positive relationship between landholding and extent of adoption is expected in the present study.

The relationship between landholding and knowledge was reported positive though non-significant by Aswathanarayana (1989) and significantly positive by Satheesh (1990).

Hence positive relationship between landholding and knowledge about recommended practice is postulated in this study.

2.3.6 Credit utilisation

The author could not come across any study showing the relationship of credit utilisation with extent of adoption of sericulture. Therefore studies in related area are reviewed and the observed relationship of credit utilisation with extent of adoption of agricultural technologies are presented below.

<u>Author (year)</u>	<u>Relationship</u>	<u>Field of study</u>
Chenniappan (1987)	Positive significant relationship	Improved practices in cotton
Sulaiman (1989)		Fertilizers in paddy
Bhatia and Singh (1991)	Positive relationship	Engineering technology
Chandra and Singh (1992)	Significant positive relationship	Tribal agriculture

Credit is an important limiting factor for the adoption of technologies which require costly inputs. Sericulture requires a lot of investment for its success. Hence a positive relationship between extent of adoption and credit utilisation is postulated in the present study.

2 3.7 Family labour participation

Reddy (1985) reported that 15 per cent of the men labourers and 63 per cent of women labourers engaged in sericulture belonged to family labour. It was worked out by Shah (1993) that 77.78 per cent of labour requirement in mulberry cultivation and silkworm rearing were met through family labour.

Studies showing the relationship of family labour participation with extent of adoption of sericulture were lacking. Bhatia and Singh (1991) in a study on extent of

adoption of engineering technology reported negative significant relationship between family labour participation and adoption

In the present study considering the family enterprise nature of sericulture positive relationship between family labour participation and extent of adoption is anticipated

2 3 8 Leisure time availability

Studies on leisure time availability and adoption of agricultural technology by farmers could not be traced The free time available to the members of family is an important and essential consideration in adoption of supplementary enterprises like sericulture

In this study leisure time availability is expected to have positive relationship with the extent of adoption

2.3.9 Social participation

Social participation was found to be positively related with extent of adoption of sericulture technology by Thangaraju (1979) The relationship was found positive and highly significant by Prakashkumar (1986) and Aswathanarayana (1989) However the relationship was found to be non significant in the study by Gopala (1991)

In the light of previous studies it is postulated that social participation would have positive relationship with extent of adoption

Aswathanarayana (1989) reported positive and highly significant relationship between social participation and knowledge level of respondents in silkworm rearing

Highly significant positive relationship between social participation and knowledge in vegetable cultivation was reported by Bonny (1990) Ingle et al (1991) reported positive significant relationship between social participation of fishermen and their knowledge about improved fishing technology

In the present study it is postulated that social participation will be positively related to knowledge level of sericulturists

2 3 10 Labour availability

The author could not come across any study related to labour availability and extent of adoption of sericulture Sharma (1985) in a study on adoption of composite fish culture reported positive relationship between labour possession and adoption

In the case of labour intensive technologies it is expected that the adoption may depend on availability of labour Sericulture, being highly labour consuming it is postulated that labour availability will be positively related to extent of adoption

2.3 11 Innovativeness

No study relating extent of adoption of sericulture with innovativeness was available Hence some related studies which showed the relationship of innovativeness with the adoption of different agricultural technologies are reviewed

Author (year)	Relationship	Field of study
Geethakutty (1982)	Positive significant relation	Rice cultivation practices
Rathinasabapathy (1987)	Highly significant positive relation	Integrated pest management in cotton
Chenniappan (1987)	Significant positive relation	Improved practices in cotton
Krishnamoorthy (1988)		Irrigated cotton & millets
Jayaraman (1988)	Highly significant positive relation	Neem coated urea
Ajaykumar (1989)	Positive significant relation	Grape cultivation practices
Ravi (1989)		Cultivation practices in Tapioca

Reddy (1991)	Positive significant relation	Recommended practices by Cotton seed growers
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Positive relationship was observed in most of the studies. Hence in this study also positive relationship between innovativeness and extent of adoption is anticipated.

Innovativeness was found to have positive relationship with knowledge level of cotton cultivators as reported by Chenniappan (1987), Rathinasabapathy (1987) and Jayaraman (1988) also have reported significant positive relationship between innovativeness and knowledge of farmers about integrated pest management in cotton and neem coated urea respectively.

In this study also positive relationship between innovativeness and knowledge level of sericulturists is postulated.

2.3.12 Economic motivation

Economic motivation or profit maximisation behaviour is one of the important variables which is having a strong say on the extent of adoption of innovations. The association was found to be significant by Thangaraju (1979) in his study on adoption of sericultural practices.

Positive significant relationship between economic motivation and extent of adoption was reported by Prakashkumar (1986) and Aswathanarayana (1989). However the relationship was non-significant in the studies of Satheesh (1990) and Gopala (1991). Choudhari and Makode (1992) reported significant positive relationship between economic motivation and level of adoption of HYV of chilli and jowar.

Based on the above reviews positive relationship between economic motivation and extent of adoption is hypothesised for the present study.

Positive significant relationship between economic motivation and knowledge of farmers was reported by Jayakrishnan (1984), Rathinasabapathy (1987), Jayaraman (1988), Krishnamoorthy (1988), Aswathanarayana (1989), Juliana et al (1991) and Ingle et al (1991) in their respective studies.

Based on these observations it is postulated that there would be positive significant relationship between economic motivation and knowledge level of sericulturists.

2.3.13 Risk orientation

Thangaraju (1979) reported significant relationship between risk orientation and adoption of sericultural practices.

Significant positive relationship between risk orientation and extent of adoption was reported by Jayakrishnan (1984), Viju (1985), Rathinasabapathy (1987) Krishnamoorthy (1988), Ajaykumar (1989) and Juliana et al (1991)

In the new and non-traditional areas sericulture is prone to several risk factors and sometimes the farmers experience heavy loss (Rao and Kumar 1993)

In the present study positive relationship between risk orientation and extent of adoption is anticipated

It was found that risk orientation had positive significant relationship with knowledge level of paddy farmers about low cost technology as reported by Jayakrishnan (1984) Similar results were observed by Rathinasabapathy (1987) among cotton growers and Juliana et al (1991) regarding integrated pest management practices

In the present study also it is postulated that risk orientation would have positive relationship with knowledge level of sericulturists

2.3 14 Extension linkage

This variable as such is not studied in earlier researches But the components of this variable such as mass

media participation, contact with extension agencies extension guidance, extension participation, training utilisation of personal sources etc have been studied in many empirical studies They are reviewed and the relationship of these variables with extent of adoption of recommend practices in the respective fields of study were as follows

Author (year)	Variable	Relationship	Field of study
Thangaraju (1979)	Mass media participation	Positively associated	Sericulture
Patel (1985)	Training	Significantly associated	Training need of sericulture
	Mass media participation		
	Contact with extension agency		
Prakashkumar (1986)	Mass media participation	Highly significant positive relation	Sericulture
	Extension participation		
	Contact with extension agency		
Shivaraja (1986)	Extension guidance	Significantly related	Bivoltine seed cocoon

Aswathanarayana (1989)	Extension participation	Highly significant positive relation	Silkworm rearing
	Mass media participation		
Satheesh (1990)	Mass media participation	Significant positive relation	Chawki rearing
	Contact with personal sources		
Gopala (1991)	Mass media participation		Sericulture
	Extension contact		

Kunju and Prabhakaran (1992) in a study of the degree of the importance of the linkage activities of the subsystems of transfer of technology system indicated that client subsystem had higher degree of perception about the importance of linkage with extension subsystem and extension subsystem perceived greatest importance for their linkage with client subsystem. This clearly shows the importance of extension linkage. In the present study also it is postulated that extension linkage would have positive relation with extent of adoption.

The relationship of the related variables of extension linkage with knowledge level of sericulturists is as follows

Author (year)	Variable	Relationship	Field of study
Aswathanarayana (1989)	Extension participation	Highly significant positive relation	Silkworm rearing
	Mass media participation		
	Extension contact		
Satheesh (1990)	Mass media participation	Significant positive relation	Chawki rearing
	Extension participation		
	Contact with personal sources		

Based on the above results positive relationship between extension linkage and knowledge level of sericulturists is postulated in this study

2 3 15 Experience in sericulture

Thangaraju (1979) found that experience in sericulture had positive association with extent of adoption of sericultural practices

In related studies also significant relationship between farming experience and extent of adoption of recommended practices in agricultural technologies was observed

<u>Author (year)</u>	<u>Relationship</u>	<u>Field of study</u>
Jayakrishnan (1984)	Significant positive relation	Dry land technology
Krishnamoorthy (1984)		Low cost technology in paddy
Ramaswamy (1987)		Turmeric cultivation
Rathinasabapathy (1987)	Non-significant	Integrated pest management in cotton
Krishnamoorthy (1988)		Irrigated cotton and millets
Bonny (1990)	Significant positive relation	Vegetable cultivation practices

Based on the above results positive relationship between the two variables is anticipated in the present study

It was found that the farming experience had significant positive relationship with knowledge of farmers as reported by Jayakrishnan (1984) However the relationship was found non-significant by Rathinasabapathy (1987)

The above results do not give a clear picture of the relationship Hence it was considered worthwhile to study the variable to find out what relation it is having with knowledge level of sericulturists With the general idea that man

learns a lot from his experiences it is postulated that experience in sericulture would have positive relationship with the knowledge level of sericulturists

2.3.16 Annual income

The nature of relationships reported in earlier studies between annual income and adoption of recommended technologies in respective fields are as follows

Author (year)	Relationship	Field of study
Thangaraju (1979)	Positive relation	Sericulture
Viju (1985)	Significant positive relation	Tribal agriculture
Chenniappan (1987)		Improved practices in cotton
Aziz (1988)		Drought management practices
Agarwal and Arora (1989)	Non-significant relation	Gobergas plant
Anithakumari (1989)		Pulses and oil seeds

Based on the review positive relationship between annual income and extent of adoption is postulated in this study

Chenniappan (1987) reported positive significant relationship between income and knowledge level of cotton growers. In line with the above observation, in the present study it is hypothesised that annual income of sericulturists would have positive relationship with their knowledge level.

2.3.17 Perception about sericulture

Jaiswal and Roy (1968) observed that the perception of farmers about profitability, cost, physical compatibility, cultural compatibility, complexity and communicability influenced the adoption of agricultural innovations. Murthy et al (1973) found that the perception of farmers about the practicability, productivity and motivity of the innovation clearly discriminated the adopters and non-adopters.

According to Chandrakandan and Subramanyan (1975) the farmers preferred to adopt farm practices which they perceive to be more communicable, simple to adopt, less costly, highly divisible and more profitable. In sericulture Thangaraju (1979) reported significant relationship between market perception and adoption of recommended practices.

It was reported by Thamilmani (1985) that perception of adopters about the attributes of blue green algae had positive relationship with their adoption.

Based on the review, it is postulated that perception about sericulture would have positive relationship with extent of adoption

Studies relating perception about an innovation and the knowledge level were not available. It is logical that perception of farmers about the innovation might be as a result of their past experiences or knowledge about the innovation. Hence positive relationship between the two variables is postulated in this study.

2.3.18 Attitude towards sericulture

Attitude is the degree of positive or negative affect associated with a psychological object (Thurstone 1946). The attitude of farmers about an innovation is important in the adoption of that innovation.

Reddy (1987) reported that attitude of farmers towards Watershed Development Programme and its adoption were interrelated positively and significantly. Chandra and Singh (1992) found positive correlation between attitude and adoption in the case of tribal agriculture. Significant positive relationship between farmers attitude and adoption of improved sugarcane production technology was reported by Singh et al (1992). Similar result was reported by Sulaiman

and Prasad (1993) among paddy farmers regarding fertilizer adoption

The above results showed positive relationship between attitude and adoption. Hence it is postulated that attitude towards sericulture will have a positive relationship with the extent of adoption.

The author could not come across any study relating attitude and knowledge level of farmers. But considering the strong association that exists between affective and cognitive components of human behaviour, it is postulated that attitude of the farmers towards sericulture would have positive relationship with their knowledge level.

2.4 Factors motivating the adoption of sericulture

Atkinson (1964) referred motivation to the arousal of tendency to act to produce one or more effects.

Motivation is the inner drive essential for mobilising the farmers to adopt new technologies. Hirsch (1966) characterised the prevalent motives in farming at any one time in history as to provide food for family, to improve the holding and to increase the income. Different patterns of motivation among farmers had been reported by many authors with regard to technology adoption.

Srirangamurthy (1975) found that farmers and farmwomen participated in training programmes with the orientations such as learning orientation, orientation of solution seeking sociability orientation, persuasion by others personal goal orientation orientation of leisure time utilization and incentives orientation

Sanjeev (1987) obtained the motivational pattern of farmers trained in KVK as chiefly economic motive followed by innovativeness prestige motive affiliation self actualisation and finally achievement motivation

Economic motive was the most important motive influencing farmers to participate in agro forestry programmes (Anilkumar 1988)

According to Latha (1990) safety was the most important motive influencing the adoption of biogas technology followed by security, utility, economy, achievement and prestige motives in the decreasing order of importance

Swamy and Jalihal (1990) identified that among the farmers who had constructed biogas plant 75 per cent were motivated by gohar gas supervisors 18.33 per cent by extension guides of agriculture university and 6.67 per cent by other persons. Most of the farmers (93.3%) who were motivated by gohar gas supervisors were not able to construct

a successful plant, while all the farmers who were motivated by extension agents of university were able to construct successful plants. Another finding was that 86.67 per cent of successful farmers had seen a successful plant before starting theirs.

Suharban et al (1991) in an attempt to find out the possible factors which motivated the participants of mushroom training course to join the training programme, identified that 45.45 per cent joined the training course to adopt mushroom growing as an occupation. To learn more about mushroom growing techniques either for their consumption or to just gain knowledge, and to gain practical training were the other important factors. The authors concluded that majority of the participants joined the training with self actualisation motive.

Singhvi et al (1993) suggested that minimal gestation period and expenditure, maximal employment potentiality and quick turnover of the investment were the important factors which led to the wide spread recognition of sericulture as one of the important rural industry.

2.5 Constraints in the adoption of sericulture

Pandya and Trivedi (1983) defined constraints as those items of difficulties or problems faced by individuals in

adoption of a technology According to Zinyama (1988) a constraint is any problem or limitation

Any problem or limitation which hinder the adoption of sericulture technology as well as the success and productivity of sericulture is considered as a constraint in the present study

Many workers had identified diverse constraints such as economical technical infrastructural and financial constraints in the field of sericulture They had been summarised and outlined in the following pages

Author (year)	Constraints identified
-- - ---	- -- ---- -- -
Maniraju (1975)	Muscardine disease incidence
Reddy and Veeresh (1976)	Low mulberry yield due to low input use less disinfection measures, lack of knowledge about plant protection of mulberry
Puttaswamy <u>et al</u> (1978)	Lack of finance, lack of space for separate rearing house non availability of layings at required time lack of knowledge lack of interest among farmers

- Rajashekaraiah (1979) Non availability of credits failure of crop lack of credit, lack of trays and equipments lack of knowledge about control of disease
- Thangaraju (1979) Lack of control measure for diseases of silkworm non availability of layings at required time non availability of labourers for plucking leaves lack of knowledge about improved methods of rearing lack of skilled labourers for rearing silkworm
- Reddy (1985) Lack of price information lack of marketing facility high cost of transportation and low prices
- Ramakrishna (1987) Uzifly incidence, lack of separate rearing shed and co-operative business between buyers and bidding agents
- Aswathanarayana (1989) Lack of capital and irrigation facility non availability of mountages lack of land for construction of rearing house secret

understanding among the buyers resulting in low bidding, delay in weighing of cocoons after auction and lack of place for keeping the cocoons in the market

Gopala and Krishna
(1993)

Lack of knowledge about disease control lack of irrigation facility lack of capital for construction of rearing house non availability of labourers in right time non availability of chawki worms in time lack of knowledge about disinfection measures lack of land for construction of rearing house and non availability of M₅ mulberry

Raveendran et al
(1993)

High mortality of silkworms supply of poor quality eggs lack of adequate skilled labourers, and inadequate field visits by technical staff

2 6 Reasons for non-adoption

There could be a number of reasons why many of the potential adopters do not come forward to adopt sericulture

Babu (1988) reported that sericulture was not taken up favourably in the drought prone area of Anantapur district in Tamil Nadu due to lack of proper cocoon marketing system, exploitation of farmers by local mandy merchants and inadequate and untimely availability of seeds. Analysing the problems related to sericulture expansion in North-Eastern states Tikoo (1989) reported that absence of commercialisation of silk industry socio economic conditions of the farmers lack of assured market and support of credit facilities inadequate extension support lack of motivation of farmers, inadequate seed production and lack of training facilities were the important reasons for non-adoption.

It was reported that lack of proper infrastructure and lack of reeling and weaving units within the state to boost the industry were the important reasons limiting the adoption of sericulture in Kerala (Anon, 1990)

Conceptual framework of the study

Based on the review presented a conceptual model was developed for the study which is presented in Fig 1

The main objective of the conceptual framework furnished here is to provide an abstract view of the adoption behaviour of sericulturists influenced by a multiplicity of internal and external factors. The extent of adoption of

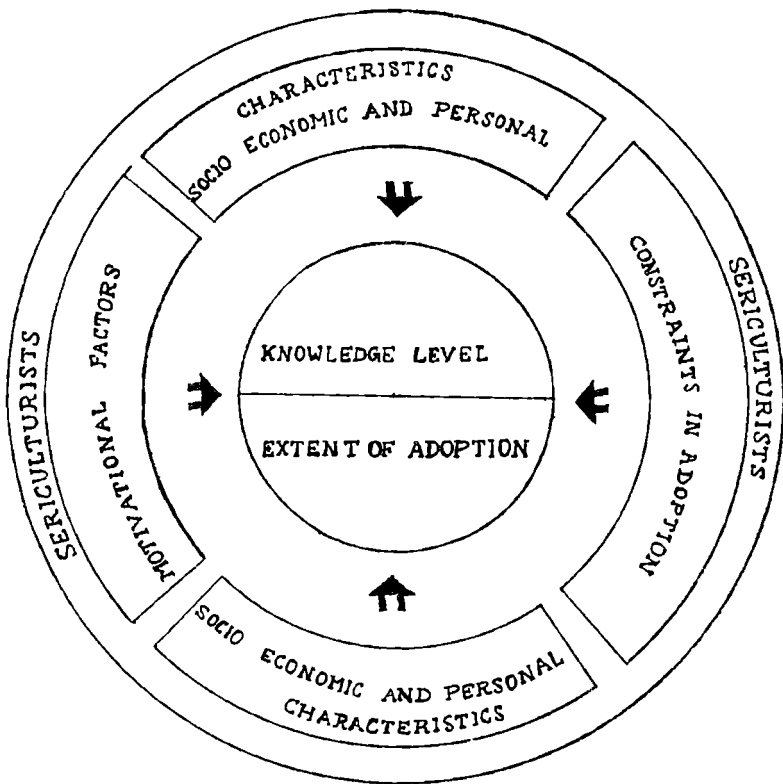


FIG 1 CONCEPTUAL FRAMEWORK FOR THE STUDY

recommended practices and the knowledge level are the two important components of adoption behaviour of sericulturists. It is accepted from past studies that the adoption behaviour is a multivariate process explained by wide spectrum of socio economic and personal factors.

The external stimuli such as constraints in the adoption of sericulture and the motivational factors also had profound influence on adoption behaviour. These factors are so intricately associated with each other that they should not be viewed as separate entities for the study. Hence a wholistic view of all these contributing factors only would give a clear picture of the adoption behaviour of sericulturists.

Methodology

CHAPTER III

METHODOLOGY

In this chapter, the methods employed in the study for data collection, data analysis and interpretation are presented under the following heads

- 3 1 Location of the study and sampling design
- 3 2 Selection and operationalisation of dependent and independent variables for the study
- 3 3 Identification of motivational factors and constraints in the adoption of sericulture enterprise by sericulturists and reasons for non-adoption by prospective sericulturists
- 3 4 Techniques employed in data collection
- 3 5 Statistical tools used in the study

3.1 Location of the study and sampling design

In Kerala, sericulture is being popularised as an employment generating enterprise for rural unemployed youth and farm women. Since the launching of the Sericulture Development Project under the Khadi and Village Industries Board (KVIB) and National Sericultural Project (NSP) of

Central Silk Board, there had been considerable expansion in the area under mulberry cultivation and number of silkworm rearers in the state. Among the 14 districts of Kerala, Palakkad and Thrissur were two of the districts with high percentage of sericulture adopters. Hence these two districts were purposively selected as the study area.

The present study was designed to analyse the adoption behaviour of sericulturists and reasons for non-adoption by prospective sericulturists. Hence, the respondents of the study were the sericulturists and prospective sericulturists from the two selected districts viz, Palakkad and Thrissur. A sericulturist, for the present study was considered as any individual who is undertaking both mulberry cultivation and rearing of silkworms. A prospective sericulturist is operationally defined as any individual who had participated in sericulture training programmes but not started sericulture.

For the selection of respondents of the study, simple random sampling technique with proportionate allocation was employed. The list of sericulturists who were undertaking mulberry cultivation and silkworm rearing in Palakkad and Thrissur districts was collected from Khadi and Village Industries Board and other voluntary organisations in these districts. Eighty sericulturists were selected from the list.

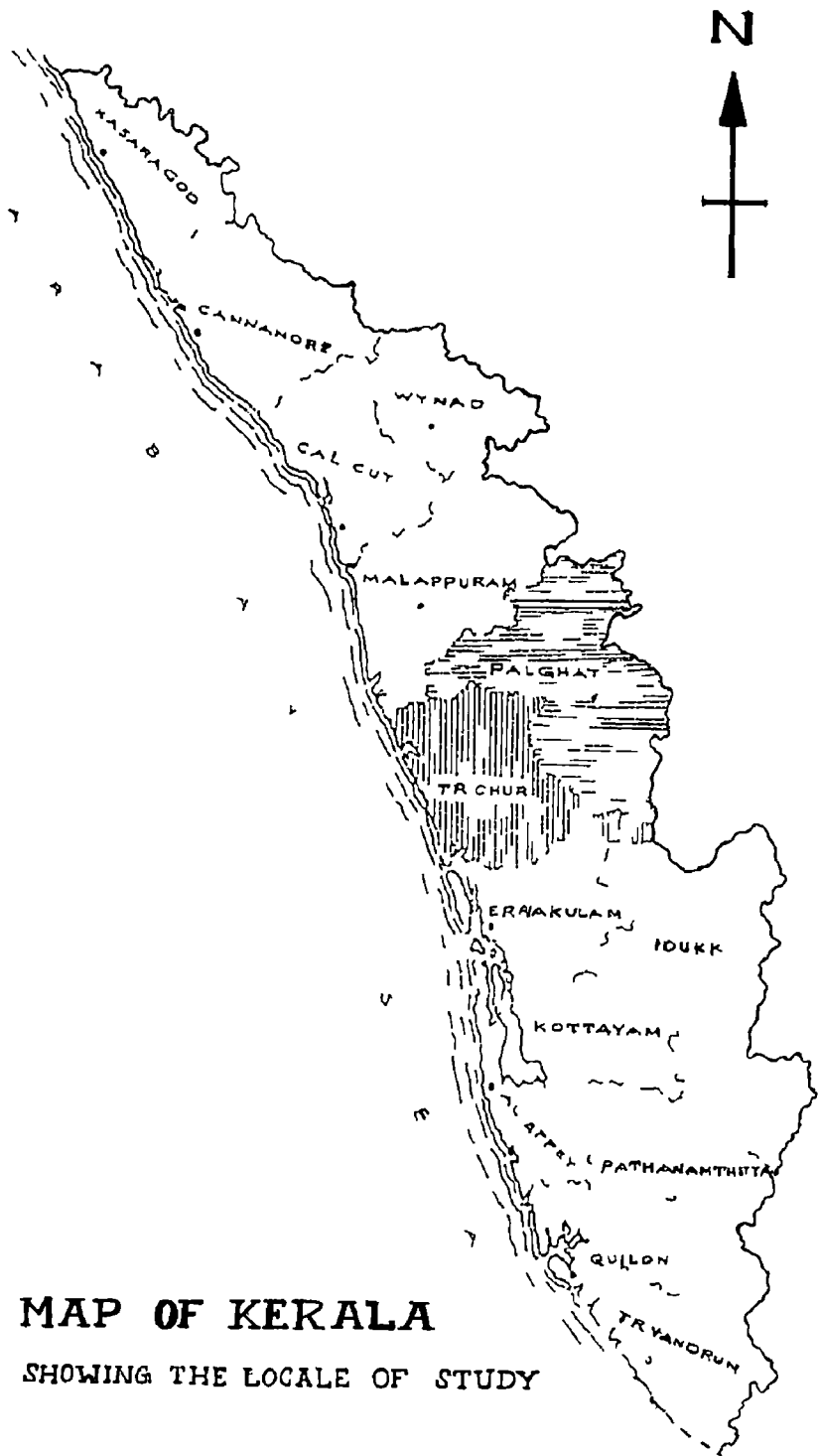


FIG 2 **MAP OF KERALA**
SHOWING THE LOCALE OF STUDY

in Palakkad district and 40 sericulturists from Thrissur district which was in proportion to the respective number of rearers in the two districts. Thus, there were 120 sericulturists, selected as respondents of the study.

For the selection of prospective sericulturists, a list of farmers who had participated in training on sericulture but not started the enterprise yet was prepared with the help of sericulture extension workers of KVIB. From this list a total of 60 farmers were selected at random from both the districts.

Thus, a total of 120 sericulturists and 60 prospective sericulturists were selected as respondents of the study.

3.2 Selection and operationalisation of variables for the study

3.2.1 Selection of dependent variables

Keeping in view the objectives of the study, review of relevant literature and discussions with subject matter specialists and officials of the KVIB, the following dependent variables were selected for the study.

- 1 Extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by sericulturists (Y_1)

2 Knowledge of sericulturists about recommended practices in mulberry cultivation and silkworm rearing (Y_2)

3 2.2 Operationalisation of dependent variables

3 2 2 1 Extent of adoption of recommended practices in mulberry cultivation and silkworm rearing

Rogers (1962) defined adoption process as the mental process an individual passes from first hearing about an innovation to its final adoption. The adoption at individual farm level is defined as the degree of use of new technology in long run equilibrium when the farmer has full information about the new technology and its potential (Feder et al , 1982). In most cases agricultural technologies are introduced in packages that include several components. The farmers may adopt the complete package of innovations or only subsets of the package. The same was found to be true with the package of improved practices in sericulture also. The extent of adoption in the present study is operationally defined as the quantitative measure of the degree of use of different recommended practices in mulberry cultivation and silkworm rearing by the sericulturists.

Many researchers had standardised various methods to quantify the extent of adoption with respect to different innovations. The method utilised in this study was based on

the adoption quotient developed by Chandrakandan and Knight (1989), which was a modification of the Adoption Quotient originally developed by Chattopadhyay (1963) and later modified by Singh and Singh (1974)

Chandrakandan and Knight (1989) measured adoption of farm technology of groundnut cultivators using an Adoption Quotient. This quotient considers four dimensions for each individual practice viz weightage for individual practice, magnitude of adoption, potential for adoption and applicability of each individual practice. The formula used was

$$A Q = \frac{\sum_{i=1}^m \frac{e_i}{E_i} \times \frac{q_i}{Q_i} \times w_i}{\sum_{i=1}^m w_i}$$

- e_i - area put under i^{th} practice
- E_i - potential area for i^{th} practice
- q_i - quantity used for i^{th} practice
- Q_i - quantity recommended for i^{th} practice
- m - number of applicable practices
- w_i - weightage assigned to i^{th} practice

In the present study, the different sub-areas of the package of improved practices for mulberry cultivation and silkworm rearing were identified through discussions with the sericulture extension officers of KVIB and sericulture experts of the Kerala Agricultural University. There were nine sub-areas in mulberry cultivation and 15 sub-areas in silkworm rearing identified altogether, forming 24 (m-24) sub-areas to be included in the adoption scale.

Each of the selected sub-areas was assigned with a weightage (w_1). The weightages were assigned based on a rating carried out by 30 sericulture field assistants of KVIB according to the contribution and importance of each sub-area towards the success of sericulture enterprise. The rating was done on a three point continuum with scores 3, 2 and 1 for the response categories viz. most important, important and least important. The mean score obtained for a sub-area by all the judges was calculated (x_1). Also the average of the mean scores of all the sub-areas (\bar{x}) was found out. Based on mean and standard deviation of the mean scores, the sub-areas were assigned with weightages (w_1) 4, 3, 2 and 1. The selected sub-areas with their mean importance scores and respective weightages are given in Table 1.

For each of these sub-area, questions were formulated covering the important practices of that area. Hence there

Table 1 List of sub areas of package of sericulture practices with respective weightages assigned

Sub areas	Mean score	Weightage
A Mulberry cultivation		
1 Variety	1 40	2
2 Spacing	1 30	2
3 FYM	2 56	4
4 Fertilizers	2 80	4
5 Pruning	2 66	4
6 Irrigation	1 93	3
7 Cultural operations	1 06	1
8 Plant protection	1 86	1
9 Leaf harvest	1 00	1
B Silkworm rearing		
1 Type of dfl	1 00	1
2 Number of dfls reared	1 27	2
3 Rearing house	1 30	2
4 Rearing equipments	1 43	2
5 Incubation	2 27	3
6 Net cleaning	1 16	2
7 Spacing worms	2 23	3
8 Feeding of worms	2 80	4
9 Storage of leaf	1 00	1
10 Temperature and RH control	1 93	3
11 Care at moulting	2 87	4
12 Mounting and harvest	1 00	1
13 Sterilisation of rearing rooms and appliances	2 90	4
14 Bed disinfection	2 03	3
15 Disease control	2 60	4

were differential number of questions under each sub-area. While assigning scores for the adoption of each practice a distinction was made between divisible and non-divisible practices in the package of sericultural practices. In the case of divisible quantitative practices like NPK fertilizers, FYM, number of dfls, equipment, etc. the scoring was done on a normative basis i.e., the level of adoption of a practice of each individual was scored in relation to the average adoption level of the practice among other respondents and its normal distribution.

A pilot study was conducted among 30 non-sample sericulturists. From the individual adoption levels of the 30 respondents for the different practices the average adoption at the pooled level was found out for respective practices. The standard deviation of the individual adoption levels was also found out. Based on these values, the scoring pattern for different individual practices were formulated. For example, from the pilot study it was found that the average number of disease free layings (dfls) reared per year per acre of mulberry garden under irrigated condition was 242 with standard deviation 161. Hence the scoring pattern for the number of dfls reared was formulated as follows:

Number of dfls reared per year per acre	Score
0	0
1-81	1
82-242	2
242-403	3
above 403	4

A similar pattern of scoring was followed for the other quantitative practices also

In the case of non-divisible/qualitative practices a scoring pattern of dichotomous nature or appropriate continuum was followed. The scoring for rainfed and irrigated cultivation was also made distinctively

Adding the scores of all the practices within a sub-area the adoption score for the particular sub-area (S_1) was calculated as

$$S_1 = \frac{s_1}{S_{\text{imax}}} - \frac{\text{Sum of the scores of all the practices in a sub area}}{\text{Maximum possible score for the sub area}}$$

From the adoption scores for different sub-areas in the recommended package of mulberry cultivation and silkworm rearing the adoption quotient for the present study was formulated as

$$A Q = \frac{\sum_{i=1}^m S_i w_i}{\sum_{i=1}^m w_i} \times 100$$

AQ Adoption Quotient

S_i = Score obtained for i^{th} sub-area

w_i - weightage for i^{th} sub-area

m - no of sub-areas in the package

($m = 24$ for irrigated condition and $m = 23$ in rainfed cultivation)

The Adoption Quotient thus calculated was on a percentage scale, so that the maximum score for any individual will not exceed 100 and the lowest will be zero

The details of the items in the adoption scale and the scores given are included in the Appendix-III

Based on the respondents Adoption Quotients, their mean and standard deviation the respondents were grouped into four categories viz , low adopters low to medium adopters medium to high adopters and high adopters

3 2 2 2 Knowledge about recommended practices in sericulture

In the present study knowledge denotes the respondent s awareness and understanding about the different

practices in the package of improved practices of mulberry cultivation and silkworm rearing. Here, the knowledge level of sericulturists on the recommended practices in mulberry cultivation and silkworm rearing was tested with an exhaustive knowledge test prepared in the sub-areas of the package of practices (The selection of sub-areas of the package of practices of sericulture was discussed in detail in section 3.2.2.1).

An exhaustive list of items in these sub-areas were collected from all possible sources. The item pool was subjected to thorough checking and editing with the help of sericulture experts and sericulture extension workers to ensure that all the important aspects of the recommended practices were included in the knowledge test. Altogether there were 60 items included under 24 sub-areas so that the knowledge test can explore the level of knowledge of the sericulturists about the recommended practices in sericulture. The items included in the knowledge test were discussed and cleared by a team of experts.

Administration of the knowledge test

The knowledge test was administered to the respondents of the study and a score of one was given for the correct answer of each item and a score of zero was given for wrong or

lack of knowledge. The score for each item was summed up to get the overall knowledge level of an individual respondent. The maximum score possible to be obtained by any individual respondent was 60 and the minimum being zero. The difference of the obtained knowledge score with the maximum possible knowledge score (60) was taken as the knowledge gap.

Based on the knowledge gap, the respondents were grouped into four categories considering the average of the knowledge gap of all the respondents and its standard deviation.

3.2.3 Selection of independent variables

Based on review of literature and discussion with extension scientists, a list of 33 variables that could possibly have relationship with the adoption of agricultural technology in general and sericulture technology in particular was prepared. These variables were administered for relevancy rating by judges who are qualified and experienced faculty members in the discipline of Agricultural Extension in Kerala Agricultural University and Tamil Nadu Agricultural University.

The judges were requested to indicate the relevancy of these variables and rate them on a three point continuum ranging from most relevant to not relevant with weightages 3

2 and 1 respectively From a total of 40 judges selected for rating response were obtained from 30 judges

The mean relevancy score for each variable was worked out by summing up the weightages obtained for a variable by the judges and dividing it by the number of judges The average of the mean relevancy scores of all the variables was calculated The variables which have a mean relevancy score above the average mean relevancy score were selected for inclusion in the study The list of variables with mean relevancy score are given in Appendix-I

Accordingly, the variables selected were

X ₁	Area under mulberry cultivation
X ₂	Education level
X ₃	Family size
X ₄	Occupation
X ₅	Land holding
X ₆	Credit utilisation
X ₇	Family labour participation
X ₈	Leisure time availability
X ₉	Social participation
X ₁₀	Labour availability
X ₁₁	Innovativeness
X ₁₂	Economic motivation

X ₁₃	Risk orientation
X ₁₄	Extension linkage
X ₁₅	Experience in sericulture
X ₁₆	Annual income
X ₁₇	Perception about sericulture
X ₁₈	Attitude towards sericulture
X ₁₉	Knowledge about recommended practices

Thus, 19 independent variables were included in total to trace the important factors contributing to the adoption of sericulture technology. While studying the influence of selected independent variables on the knowledge of recommended practices, the situational variables like X₆, X₇, X₈ and X₁₀ were excluded.

3.2.4 Operationalisation and measurement of independent variables

3.2.4.1 X₁ Area under mulberry cultivation

This refers to the actual land area occupied by mulberry cultivation at the time of investigation.

The total land area under mulberry cultivation, either as monocrop or as intercrop, was recorded in acres as reported by the respondents.

3 2 4 2 X_2 Education level

Education level is operationalised as the level of informal or formal education attained by the respondent

The education level was scored as per the scale used by Karippai (1988)

3 2 4 3 X_3 Family size

Family size refers to the number of family members of either sex residing with the respondent

The respondent was asked to indicate the number of members in his family and a score of one was given for every member which on adding gave the total family size

3 2 4 4 X_4 Occupation

Occupation is operationally defined as an activity in which the respondent is continually engaged for his livelihood or an additional income and was measured depending on the degree of orientation towards agriculture and/or sericulture

The occupation of the respondents was measured on an arbitrary scale developed for the purpose in which both the major and sub occupations were considered. The occupation of sericulture alone was given the highest score of seven. The occupation as an employee with agriculture only as a sub

occupation was given the lowest score of one Other occupations were scored in between depending on the relative importance given to agriculture by the respondent The categories with corresponding scores are given below

Category		Score
-----		-----
Major occupation	Sub occupation	
-----	-----	
Sericulture		7
Agriculture		6
Agriculture	+ Part time business	5
Agriculture	+ Business	4
Agricultural labour	+ Agriculture	3
Business	+ Agriculture	2
Employee	+ Agriculture	1

3 2 4 5 X_5 Land holding

Land holding is operationally defined as the area of land owned and cultivated by the respondent which includes both wet land and garden land

The total land holding including both wet and garden land was considered and recorded in acres

3 2 4 6 X_6 Credit utilisation

Credit utilisation is operationally defined as the behaviour of respondent in utilising the credit facilities for sericulture from institutional/non-institutional sources in adequate quantity and utilising it for the right purpose without making defaults in repayment

This variable was measured using an arbitrary scale, which was a modification of the scale used by Sulaiman (1989) The items and scoring pattern followed are given below

Have you availed any loan for sericulture	Yes/No
	(2) (0)

If yes

Have you taken the full amount as per the proposal of KVIB	Yes/No
	(2) (1)

Have you utilised the loan for sericulture itself	Yes/partially/No
	(2) (1) (0)

Have you repaid/are you repaying the loan without defaults	Yes/occasionally/No
	(2) (1) (0)

The scores of respective response category of the respondent were added together to obtain the credit utilisation score (X_7)

3 2 4 7 X_7 Family labour participation

This variable is operationalised as the extent of

participation of the respondent s family members in various labour requiring activities of mulberry cultivation and silkworm rearing

It has been calculated as the average of the percentages of work done by family labour in mulberry cultivation and silkworm rearing

Shah (1993) had worked out the number of mandays required for different activities of mulberry cultivation and silkworm rearing Based on this the percentage of work required in different activities were calculated

The participation of family labour in various activities of mulberry cultivation and silkworm rearing were measured separately on a three point continuum viz , full, partial and nil with weightages 1 0 5 and 0 respectively The percentage of work under each activity was multiplied by the weightages of the respective response category Then the scores of mulberry cultivation and silkworm rearing were added together and the average of the two totals was taken as the score for family labour participation (X_g)

The activities with the percentage of work required are as given below

Activity		% of work involved	Family labour participation		
			Full	Partial	Nil
A	Mulberry cultivation		(1)	(0 5)	(0)
1	Irrigation	15			
2	Fertilizer and manure application	40			
3	Leaf harvesting for young age worms	10			
4	Leaf harvesting for old age worms	30			
5	Pruning	50			
Total		100			
B					
Silkworm rearing		% of work involved	Full	Partial	Nil
			(1)	(0 5)	(0)
1	Young ages	18			
2	Old ages	60			
3	Mounting	16			
4	Harvesting and bagging	6			
Total		100			

3 2 4 8 X_8 Leisure time availability

Leisure time availability is operationally defined as the total free time (hours) available for the members of the respondent's family, which can be utilized for any subsidiary activities including the time now used for sericulture activities

Leisure time availability was measured by asking the respondent to indicate the perceived free time available to him and the members of his family per day including the time spent on sericulture. It was recorded in hours.

3 2 4 9 X_9 Social participation

Social participation has been operationalised as the degree of involvement of the respondent in the activities of formal or informal social organisations either as a member or as an office bearer and the regularity in attending the meetings/activities.

The scale used by Kamarudin (1981) was used in this study, with necessary modifications.

The scoring pattern was as follows

<u>Membership</u>	<u>Participation in meetings/activities</u>
No membership - 0	Always - 2
Member - 1	Sometimes - 1
Office bearer - 2	Never - 0

The membership scores were multiplied by participation scores for each organisation and added together to get the social participation score (X_9)

3 4 10 X_{10} Labour availability

Labour availability is operationally defined as the perceived easiness in getting hired labour for mulberry cultivation and silkworm rearing as and when required

Each respondent was asked to indicate the availability of hired labour on a four point continuum viz easily available, available, difficult and not available with scores 3, 2, 1 and 0. The scores were summated to get labour availability score

3 2 4 11 X_{11} Innovativeness

Innovativeness is defined as the inclination of the respondent to develop interest in and desire to seek changes

in the existing practices related to farm and home and to adopt such changes as and when feasible

The scale developed by Moulik (1965) was used to measure innovativeness in this study. The scale consisted of three sections of statements each having a set of three items with weightages one, two or three. The respondent was asked to mark two items in each section one to which he is most like and the other to which he is least like. The ratio of the weightages of most like item to the least like item in the three sections were added together to get the score of innovativeness.

3 2 4 12 X_{12} Economic motivation

Economic motivation is operationalised as the drive of the respondent for occupational success in terms of profit making and the relative value placed on economic ends.

The scale developed by Supe (1969) was used to measure economic motivation. The scale consisted of six statements, of which the first five were positive while the last one was negative. The scoring was done on a five point continuum. A score of 4, 3, 2, 1 or 0 was assigned for the response categories strongly agree, agree, undecided, disagree or strongly disagree respectively. The score was reversed in the case of negative statement. The scores obtained on each

statement were cumulated to obtain the total score of a respondent on this variable. The maximum score that could be obtained by a respondent was 24 and minimum zero.

3 2 4 13 X_{13} Risk orientation

Risk orientation is operationalised as the degree to which the respondent is oriented towards risk and uncertainty, and exhibits courage to face problems of risk.

The scale developed by Supe (1969) was used to measure risk orientation of the respondents. The scale consisted of six statements of which five were positive and the fifth one negative. The respondents were scored on a five point continuum with scores 4, 3, 2, 1 and 0 for their responses strongly agree, agree, undecided, disagree and strongly disagree respectively. The scores were reversed for the negative statement. The scores obtained on each statement were cumulated to obtain the total score of a respondent on this variable, so that the maximum score for any individual will be 24 and the minimum zero.

3 2 4 14 X_{14} Extension linkage

Linkage was defined as the two-way communication between the subsystems of Transfer of Technology (Ban and Hawkins 1988).

Extension linkage is operationally defined as the degree of two-way information flow and contact existing between the client subsystem and extension subsystem

Rahiman et al (1990) identified the areas of functional linkage of client subsystem to extension subsystem as participation in exhibitions, training discussions, subscribing to extension journals and establish correspondence with extension personnel. The identified areas of linkage of extension subsystem to client subsystem are organise exhibitions and provide information support through All India Radio seminars publications and newspapers

Gopala (1991) while studying the extension contact of sericulturists had given a score of one for the awareness of the respondent about the interpersonal sources of extension following a method which was earlier developed by Hiriyannaiah (1977)

In this study extension linkage was conceptualised as consisting of four components viz awareness about the extension sources contact with extension sources receiving on-farm guidance and participation in extension programmes

The scoring pattern adopted was as follows

a A score of one for awareness of each source

- b Contact with extension sources were scored depending on the oftenness in contact on a five point continuum, viz., most often, often, sometimes rarely and never with scores 4 3, 2 1 and 0 In the case of mass media sources the oftenness in attending/reading or listening was considered
- c Onfarm guidance received from the extension sources were measured depending on their oftenness on a five point continuum as in the case of extension contact
- d Extension participation was measured depending on the participation of respondents in trainings meetings seminars etc conducted by various extension agencies Monthly training on sericulture was given a score of four and other extension programmes were scored on three point continuum viz , whenever conducted, sometimes and never with scores two, one and zero

The scores obtained on each extension source under the four components were added together to get the total score for the variable extension linkage

3 2 4 15 X_{15} Experience in sericulture

Experience in sericulture is operationally defined as the practical acquaintance in sericulture gained by the

respondent by actually doing mulberry cultivation and silkworm rearing

It was measured as the number of batches of silkworm rearings taken by the respondent

3 2 4 16 X_{16} Annual income

Annual income is operationalised as the gross earning in a year of the respondent in monetary terms from both agriculture and non-agriculture

It was measured by asking the respondent to indicate the total annual income of his family as expressed in thousand rupees

3 2 4 17 X_{17} Perception about sericulture enterprise

Perception about sericulture is operationally defined as the respondent's meaningful sensation about the worth and efficiency of sericulture in terms of its practicability, productivity and motivity based on his prior learning and/or experience

Practicability refers to the ease or difficulty with which sericulture be adopted by mobilising or utilising the already existing skills and resources Productivity refers to the overall economic improvement resulting from the adoption

of sericulture Motivity refers to the ability of sericulture to motivate the respondents to adopt it by itself (Murthy et al 1973)

The perception of respondents about sericulture was measured using the scale developed by Murthy et al (1973) after making necessary adaptations to suit sericulture technology The scale consisted of 12 items under three subdivisions and each item was scored on a five point response category moving from most favourable perception to least favourable perception with scores 5 4 3 2 and 1 The scores were added across the items to get the total score of perception

3 2 4 18 X_{18} Attitude towards sericulture

Attitude is operationally defined as the degree of positive or negative affect of the respondent towards sericulture

The attitude of respondents towards sericulture was measured using an attitude scale developed for the purpose following Likert's summated rating technique An exhaustive list of statements which expresses either positive or negative attitude towards sericulture were collected after discussion with sericulture experts and sericulturists These statements were carefully edited against the criteria described by

Edwards (1957) These selected statements after a non-sample pilot study were subjected to item analysis as suggested by Edwards (1957) Based on the power of a statement to discriminate between the high attitude group and low attitude group as evident from the high t value, eight statements (four positive and four negative) were selected for inclusion in the final attitude scale (Appendix-II)

This scale was administered to the respondents on a five point continuum, with scores 4 3 2 1 and 0 for positive statements and in reverse for negative statements The scores obtained by a respondent for all the items were added to get the attitude score

3 3 1 Factors motivating the adoption of sericulture

3 3 1 1 Motivational factors

Motivation refers to the emerging behaviour of the clientele towards the acceptance of the new idea or practice (Murthy et al 1973)

For the present study the motivational factor in adoption of sericulture was operationally defined as any factor relating to sericulture or to the respondent that might have influenced the respondent to adopt sericulture

Suharban et al (1991) studied the factors which motivated the unemployed youth to participate in training programmes in mushroom cultivation by finding out the frequency of participants motivated by each factor

In the present study, based on review of literature and discussion with officials of KVIB, eleven important factors, which could influence the adoption of sericulture were identified. The selected factors are given in Appendix III. The respondents were asked to choose any number of factors which had influenced them to adopt sericulture and rank them according to their relative importance. As per the scoring pattern followed, the first choice was given the highest score (eleven) and the subsequent choices were scored one point less successively. The scores of each statement by all the respondents were added together to get the cumulative score for the factor.

3.3.1.2 Motivational agents

An attempt was made to identify the important motivational agents for the respondents to adopt sericulture. The motivating agent is operationally defined as the formal or informal source of influence in one/many of the different stages of adoption process.

Based on discussions with sericulture extension workers and extension scientists, all possible sources of influence were listed out. The respondents were asked to report the source of influence to them in different stages of adoption prior to the implementation of sericulture. The frequency of respondents motivated by each source was then worked out.

3.3.2 Constraints in the adoption of sericulture technology by the sericulturists

One of the important objectives of the study was to identify the constraints in adoption of sericulture technology as perceived by the sericulturists.

A constraint is operationally defined as any on-farm or off-farm condition experienced by the sericulturists which limits or acts as barrier in the adoption of sericulture to the optimum potential.

The preliminary selection of the important possible constraints that are faced by the sericulturists was carried out through the following steps:

1. Farmer's appraisal - The respondents of the pilot study in a non-sampling area were asked to list out all the important constraints experienced by them.

- 2 Experts opinion - The sericulture field extension workers were requested to list out the important constraints which they perceive, as likely to be faced by the sericulturists
- 3 Review of relevant literature The important constraints in sericulture which appeared in literature were collected

From all these sources the most frequent constraints were selected to be included in the final list Thus altogether 14 constraints were identified

The procedure used by Syamala (1988) was followed for ranking the constraints The response to each constraint was obtained on a four point continuum viz most important important less important and least important with weights 3, 2, 1 and 0 respectively For each constraint the frequency of response under each response category was multiplied with its respective weightage and added to get a cumulative index for that particular constraint The constraints were then ranked based on this cumulative index The list of constraints identified are included in the Appendix-III

3 3 3 Reasons for non-adoption by prospective sericulturists

An attempt was also made to identify the important

reasons for non-adoption of sericulture enterprise by prospective sericulturists Sixty randomly selected prospective sericulturists were contacted and the factors or reasons which prevented them from starting sericulture were recorded The frequency of the respondents who were affected by each factor was worked out Based on this frequency the factors were ranked

3 4 Techniques employed in data collection

The data were collected from the respondents using a well developed interview schedule prepared for the purpose (Appendix-III) The prepared schedule was tested through a pilot study conducted among 30 sericulturists in the non-sampling area of Thrissur and Palakkad district Based on the pilot study, necessary modifications were made in the schedule and the final interview schedule consisted of six parts

- A Personal variables
- B Adoption scale
- C Knowledge test
- D Motivational factors and the motivational agents
- E Constraints in adoption
- F Reasons for non-adoption

The same schedule was used for both sericulturists and

prospective sericulturists In the case of prospective sericulturists part A & F only were applicable

The investigation was carried out during 1993 November-March 1994 The respondents were personally interviewed by the researcher

3.5 Statistical tools used in the study

The data collected were processed and analysed in accordance with the objectives of the research problem Different statistical tools employed in the analysis of the data to compute the adoption quotient, pattern of relationships between the variables etc were

3.5.1 Averages, standard deviation and percentages

In descriptive analysis of the raw data to study the distribution of respondents and also to have a profile of the respondents simple statistical measures like averages, standard deviation and percentages were used

3.5.2 Student's 't' test

Student's t test was used to test the significance of difference between means of the socio personal and economic characteristics of the sericulturists and prospective sericulturists

3 5 3 Simple correlation analysis

The simple correlation analysis was done to study the relationship between the independent and dependent variables

3.5.4 Step-down regression analysis

This was done to know the relative effect of the independent variables in predicting the dependent variable and to select the best subset of independent variables which could explain the variability in the dependent variable

3 5.5 Path analysis

Path analysis was carried out to make an assessment of the relative influence of one independent variable (antecedent variable) on another independent variable (consequent variable) In this analysis the correlation coefficient between two variables was decomposed into a series of parts, indicating the paths of influence leading through intermediate variables In the present study the path analysis was done to find out the direct effects and routes of indirect effect of the independent variables on the dependent variable

Results & Discussion

CHAPTER IV
RESULTS AND DISCUSSION

A detailed account of the findings of the study, with supporting data together with a validation and discussion of results are presented in this chapter. All relevant results are logically arranged into the following sub-headings

- 4 1 Extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by the sericulturists
- 4 2 Knowledge gap existing among sericulturists with respect to the recommended practices in sericulture
- 4 3 Relationship of selected independent variables with dependent variables
- 4 4 Factors which motivated the sericulturists to take up sericulture
- 4 5 Constraints in the adoption of sericulture enterprise
- 4 6 Reasons for non-adoption of sericulture enterprise by prospective sericulturists

4.1 Extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by the sericulturists

4.1.1 Adoption Quotients of the sericulturists

The results of the analysis of the adoption quotients of the sericulturists are presented in Table 2

It is evident from the Table 2 that the sericulturists of Palakkad and Thrissur districts had an average adoption quotient of 66.19. The lowest adoption quotient was 45.93 and the highest was 92.24 showing a wide range in the extent of adoption.

A glance through the Table 3 reveals that only 16.67 per cent of the sericulturists belonged to the high adoption category with adoption quotient above 75.50. The highest number of the respondents (42.50 per cent) belonged to the low to medium adoption category whereas nearly one-fourth of the respondents belonged to medium to high adoption category. The rest 13.33 per cent respondents had only low adoption quotients (Fig 3).

It was found that majority of the respondents (70.00%) were medium adopters of recommended practices in mulberry cultivation and silkworm rearing. This result was in conformity with the report by Aswathanarayana (1989).

Table 2 Adoption quotient of sericulturists

(n - 120)

Maximum	Minimum	Average (\bar{Y}_1)	Standard deviation
92 24	45 93	66 19	9 3

Table 3 Distribution of sericulturists based on adoption quotient

(n 120)

No	Category	Adoption quotient	Frequency	Percentage
1	Low adopters ($< \bar{Y}_1 - 1 \text{ S D}$)	<56 89	16	13 33
2	Low to medium adopters ($\bar{Y}_1 - 1 \text{ S D}$ to \bar{Y}_1)	56 90 to 66 19	51	42 50
3	Medium to high adopters (\bar{Y}_1 to $\bar{Y}_1 + 1 \text{ S D}$)	66 20 to 75 44	33	27 50
4	High adopters ($> \bar{Y}_1 + 1 \text{ S D}$)	>75 50	20	16 67

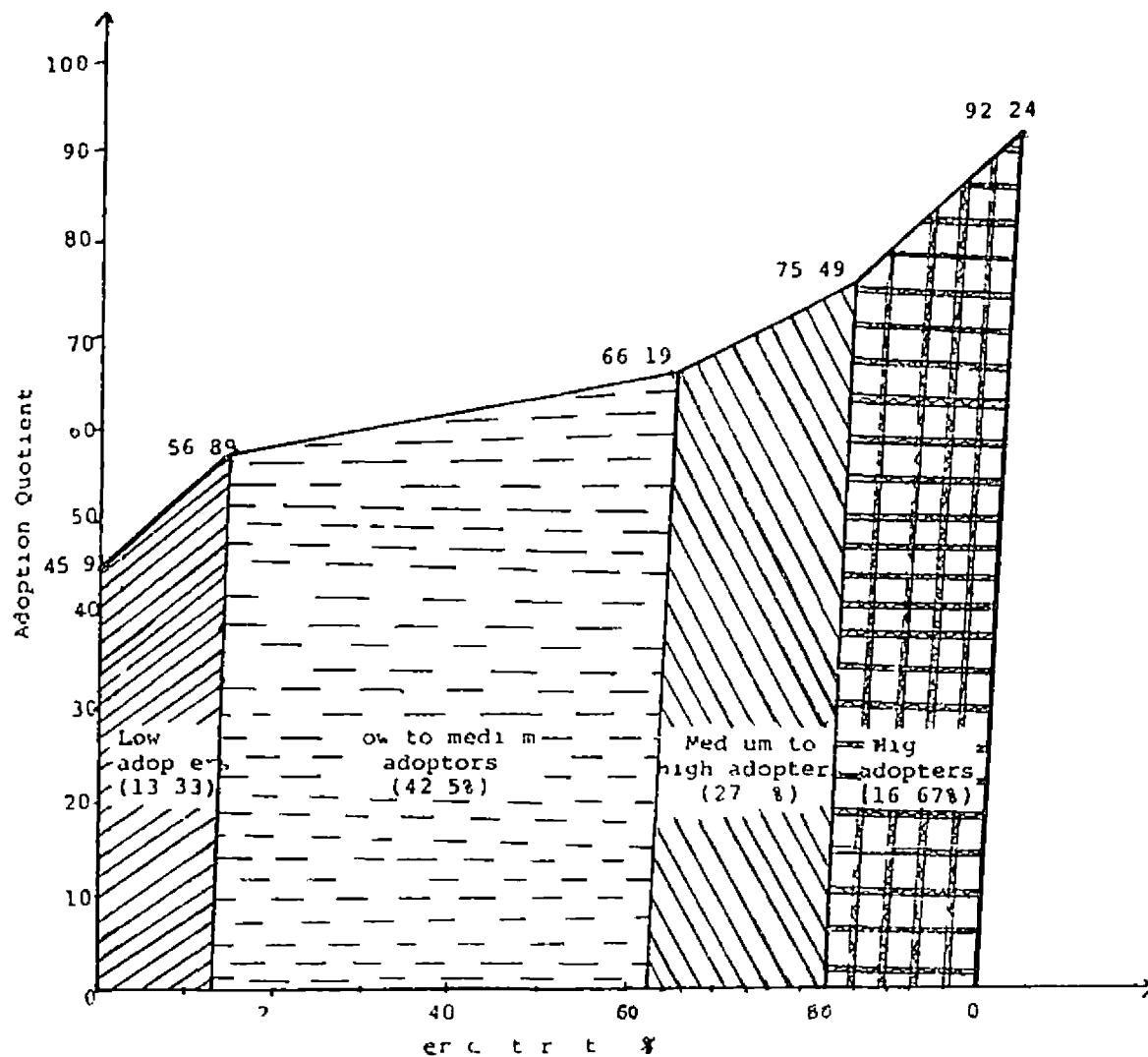


Fig 3 Distribution of sericulturists based on their Adoption Quotient:

A critical interpretation of the average adoption quotient revealed that despite the efforts of the extension agencies, there existed a considerable gap between the technologies recommended and the extent of adoption

Hence a detailed investigation on to the sub-area wise extent of adoption was made

4 1 2 Extent of adoption of recommended practices

The results of the sub area wise extent of adoption are given in Table 4. The respondents who had adopted all the practices in a sub-area were considered as full adopters and who had not adopted any practice were considered as non adopters whereas the rest were considered as partial adopters. In the case of quantitative practices the respondents were grouped into high adopters and low adopters based on their adoption level under each sub-area either above or below the average level (Fig 4)

4 1 2 1 Mulberry cultivation

It could be seen from the Table 4 that among the nine areas of recommended practices in mulberry cultivation the respondents had recorded cent per cent adoption for the variety and method of leaf harvest. Majority of the respondents (65.0% and 70.0%) had adopted the recommended

Table 4 sub area wise extent of adoption of recommended sericultural practices
n=120

No	Sub area	Mean score	Extent of adoption	Frequency	Percentage
1	2	3	4	5	6
A Mulberry cultivation					
1	Variety	2 00	N A	0	0 00
			F A	120	100 00
2	Spacing	1 30	N A	42	35 00
			F A	78	65 00
3	FYM	2 07	N A	14	11 67
			L A	66	55 00
			H A	40	33 33
4	Fertilizer	1 70	N A	14	11 67
			L A	40	33 33
			H A	66	55 00
5	Pruning	2 80	N A	2	1 66
			P A	54	45 00
			F A	64	53 33
6	Irrigation	2 09	Rainfed	26	21 67
			L A	12	10 00
			H A	82	68 33
7	Cultural operation	0 80	N A	13	10 83
			P A	23	19 16
			F A	84	70 00
8	Disease control	0 00	N A	120	100 00
			F A	0	0 00
9	Leaf harvest	2 00	N A	0	0 00
			F A	120	100 00
B Silkworm rearing					
1	Type of dfl	1 00	N A	0	0 00
			F A	120	100 00
2	Number of dfls	1 17	L A	77	64 17
			H A	43	35 83

Table 4 Continued

1	2	3	4	5	6
3	Rearing house	1 35	L A H A	70 50	58 33 41 67
4	Equipment	1 21	L A H A	56 64	46 67 53 33
5	Incubation and uniform hatching	2 91	P A F A	8 112	6 67 93 33
6	Bed cleaning using net	2 00	N A F A	0 120	0 00 100 00
7	Spacing of worms	2 87	P A F A	21 99	17 50 82 50
8	Leaf feeding	4 00	N A F A	0 120	0 00 100 00
9	Storage of leaf	0 70	P A F A	83 37	69 17 30 83
10	Temperature and RH control	0 77	N A L A H A	45 31 44	37 50 25 83 36 67
11	Care at moulting	8 18	P A F A	70 50	58 33 41 67
12	Moulting density and harvest	0 96	P A F A	11 109	9 17 90 83
13	Sterilisation of rearing rooms and appliances	2 48	L A N A	64 56	53 33 46 67
14	Bed disinfection	1 72	L A H A	77 43	64 17 35 83
15	Disease control	0 35	N A P A	95 25	79 17 20 83

P A Full adoption P A Partial adoption L A Low adoption H A High adoption
N A Non adoption

spacing and cultural operations Recommended pruning techniques were adopted by a little more than half (53.33%) of the respondents

It was found that only one third of the respondents had applied FYM above the average level Fifty five per cent of the respondents had applied only lesser quantities of FYM whereas 11.67 per cent had not applied any organic manure In the case of fertilizers, majority (55.00%) of the respondents had applied fertilizers above the average level Among the rest of farmers 11.67 per cent had not applied fertilizers and 33.33 per cent had applied only lower quantities

It was found that 21.67 per cent of the respondents were growing mulberry as rainfed crop and majority (68.33%) of the respondents were adopting higher irrigation level

None of the farmers was adopting any disease control measures in their gardens

It could be inferred that, most of the respondents had adopted relatively simple practices like variety spacing cultural operations irrigation and method of leaf harvest It was found that all the respondents were cultivating the improved variety Kanva-2 This full adoption might be due to the fact that the farmers were supplied with the cuttings from KVIB The deviation by 35.00 per cent of the respondents in

the spacing of mulberry plants might be due to the intercropping nature of mulberry followed by majority of farmers. It was found that 54.17 per cent of the respondents were growing mulberry as an intercrop in coconut gardens or in homesteads. When mulberry is grown as one of the component in homesteads, it will be difficult for the farmers to maintain the correct spacing.

High cost of fertilizers and lack of awareness about the recommended doses might be the probable reasons for not adopting the full dose of fertilizers. Many of the farmers had reduced the number of splits and some had even not applied any fertilizer. In the case of FYM also it was found that cost and availability were the major considerations. So the farmers had restricted the use of FYM to the level which is available with them from the domestic herds. Only very few had applied FYM purchased from outside.

It was found that a great majority of the respondents were not aware of the plant protection measures in mulberry. They were found to possess a wrong notion that spraying chemicals on mulberry will be detrimental to the worms and so they usually pruned the crop when any serious disease was noticed.

4 1 2 2 Silkworm rearing

While analysing the silkworm rearing practices it was found that almost all the farmers were following the type of dfl incubation and uniform hatching , bed cleaning using net spacing of worms leaf feeding and mounting density and harvest in the recommended way

The recommended practices for storage of leaves and care at moulting were only partially adopted by majority of the respondents

Almost two third of the respondents were rearing only lesser number of dfls per year than the average level It was found that majority (58 33%) were not having an adequate rearing house of the recommended type and size In the case of rearing equipment also nearly half (46 67%) of the respondents had only lesser number of equipment than the average level

Majority of the respondents had recorded only lower adoption levels for the practices such as temperature and RH control sterilisation of rearing rooms and appliances bed disinfection and disease control

A careful analysis of the above results indicated that most of the respondents had adopted the simple practices like

type of dfl, incubation and uniform hatching feeding spacing cleaning, mounting and harvesting as per recommendations These practices were the basic areas of the package of silkworm rearing practices Most of the respondents had participated in sericulture training programmes and hence were well aware of the importance of these practices resulting in the adoption of those practices It can also be observed that these practices do not involve any additional input cost These require only labour either family labour or hired labour

All the respondents were buying the dfls from recognised sources of the KVIB or CSB The respondents were rearing crossbreeds or purelines The farmers who opted pureline seed cocoons were doing so because of the assured market price for the seed cocoons

In the case of practices which requires more care and effort on the part of farmers like environmental regulations, sterilisation, disinfection and disease control the extent of adoption was less Regarding the planning aspects like number of dfls reared rearing house and equipment also the respondents had only low adoption

Rearing house and rearing equipment are the basic requirements for silkworm rearing A well ventilated separate

rearing shed is necessary for proper care and protection of worms. It was found that only 47.75 per cent of the respondents had a separate rearing house. The rest of the farmers were rearing the worms in a room attached to their house or in dwelling rooms itself. The number of trays and chandrika/netrika possessed by the rearers was also lower than the actual requirement. The probable reason for the inadequate housing and equipment facility may be the financial constraints. It was reported by Benchamin (1993) that the capital requirement for construction of rearing house and purchasing equipment was Rs 25,000 and Rs 11,250 respectively. This heavy investment might have made the farmers to work on with much lower facilities.

It was found that the average number of dfl reared per year from one acre of irrigated mulberry garden was 209.48 while it was 145.12 from rainfed mulberry. The study also revealed that 64.17 per cent of the respondents was rearing still lower number of dfls than this average level. This might be due to the lack of sufficient rearing house and equipment facilities. Also it was observed that most of the respondents were rearing dfls which can be managed by the family members themselves. This also resulted in rearing lesser number of dfls than the potential.

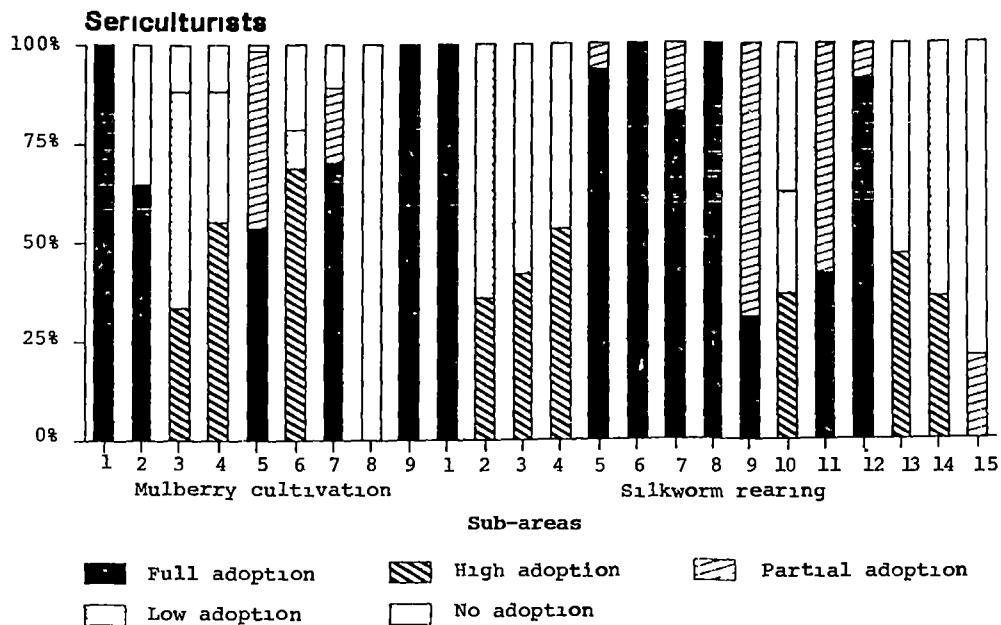


Fig 4 Sub-area wise extent of adoption of recommended sericultural practices

The low adoption of practices such as temperature and humidity regulations, disinfection disease control etc was found probably as a resultant of lack of proper knowledge and the complexity of the practices. It was also noticed that lack of a separate rearing shed was an important limiting factor for the adoption of sterilisation of rearing rooms. An effective sterilisation technique will be possible only in a well built rearing shed, as it necessitates 24 hours sealing of rearing rooms after spraying formalin. In the case of disease control also, the farmers were not aware of the recommended control measures.

It is evident from the findings that for some of the crucial sericultural practices the adoption level was low. This implies that intensive efforts needed to be taken up to educate the sericulturists on these vital aspects.

4.2 Knowledge gap existing among sericulturists regarding the recommended practices in sericulture

4.2.1 Knowledge gap

The results of the investigation on the knowledge level of the respondents are presented in Table 5 & 6.

It was found that the average knowledge gap existing among the respondents was 22.96 (38.26%). The maximum

Table 5 Knowledge gap of sericulturists

(n 120)

Maximum	Minimum	Average (\bar{Y}_2)	Standard deviation
46 (76.67%)	1 (1.67%)	22.96 (38.26%)	10.03

Table 6 Distribution of respondents based on knowledge gap

(n 120)

No	Category	Knowledge gap	Knowledge gap (%)	Frequency	Percentage
1	Poor knowledge ($>\bar{Y}_2 + 1 S D$)	>32.99	>54.35	50	41.67
2	Low knowledge (\bar{Y}_2 to $\bar{Y}_2 + 1 S D$)	22.97- 32.98	38.28 54.35	18	15.00
3	Medium knowledge ($\bar{Y}_2 - 1 S D$ to \bar{Y}_2)	13.23- 22.96	22.05 38.27	32	26.67
4	High knowledge ($<\bar{Y}_2 - 1 S D$)	<13.23	<22.05	20	16.66

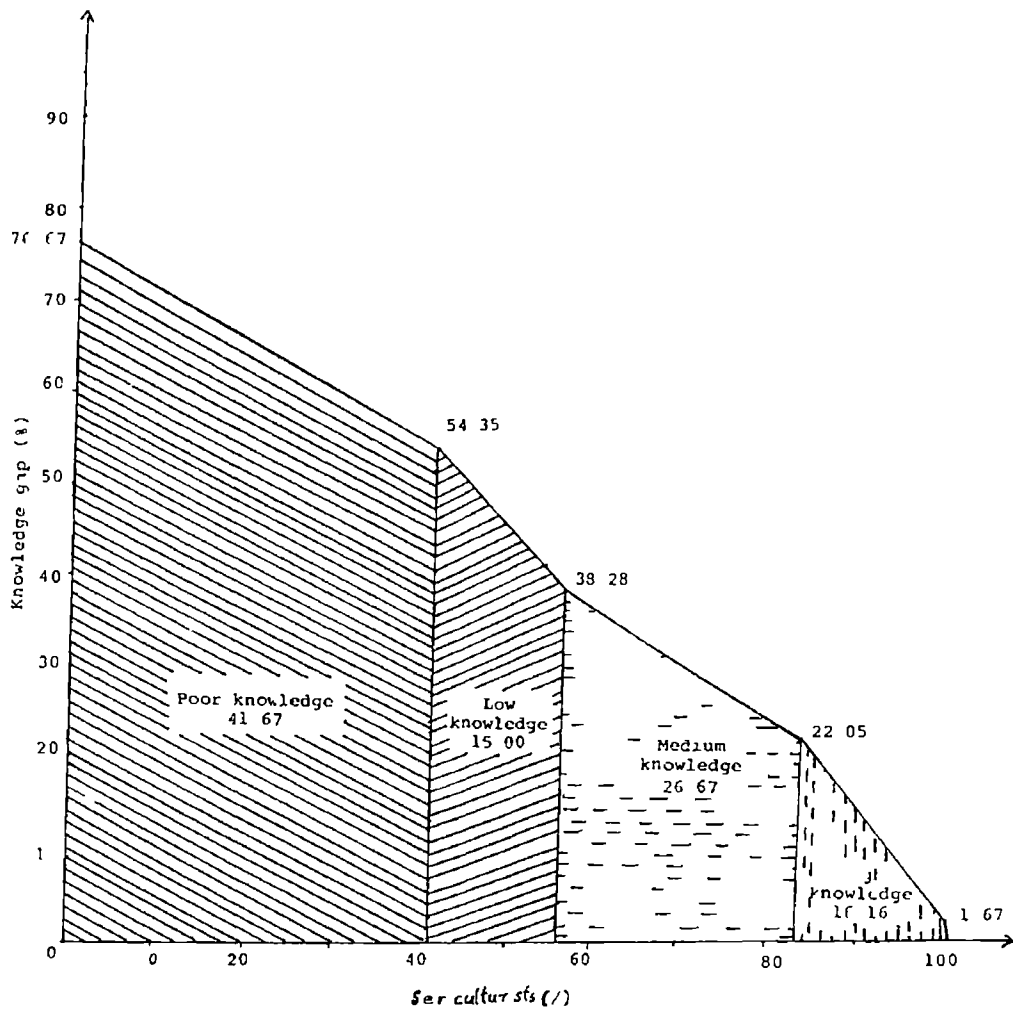


Fig 5 Distribution of sericulturists based on their knowledge gap

knowledge gap recorded was 46 (76.67%). The distribution of respondents based on their knowledge gap (Table 6) showed that highest number of respondents (41.66%) belonged to the poor knowledge group. They had a knowledge gap more than 54.35 per cent. An additional 15 per cent belonged to the low knowledge group with a knowledge gap in between 38.28 and 54.35 per cent. It was found that only 16.66 per cent of the respondents have high knowledge with knowledge gap only less than 22.05 per cent (Fig 5).

Considering the newness or recent introduction of sericulture technology in the state the present result is quite understandable. This points to the necessity of much concentrated efforts to be put into training and knowledge dissemination of sericulture practices.

4.2.2 Sub-area wise knowledge level of the respondents

The sub area wise analysis of the knowledge level using percentage analysis are given in Table 7 and Fig 6.

It was noticed that considerable knowledge gap existed in practices like FYM application, pruning, fertiliser application and plant protection of mulberry garden. In the case of silkworm rearing practices high knowledge gap was found with respect to number of dfls rearing house.

Table 7 Sub area wise knowledge level of sericulturists

No	Sub area	Knowledge level					
		Full knowledge		Partial knowledge		No knowledge	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
							n 120
A Mulberry cultivation							
1	Variety	90	75 00			30	25 00
2	Spacing	99	82 50			21	17 50
3	FYM	59	49 17			61	50 83
4	Fertilizer	24	20 00	59	49 17	37	30 83
5	Pruning	39	32 50	79	65 83	2	1 67
6	Irrigation	88	73 33			32	26 67
7	Cultural operation	120	100 00				
8	Plant protection			46	38 33	74	61 67
9	Harvest of leaf	120	100 0				
B Silkworm rearing							
1	Type of dfl	87	72 50			33	27 50
2	Number of dfls	34	28 33			86	71 66
3	Rearing house	36	30 00	78	65 00	6	5 00
4	Equipments	33	27 50	2	1 67	85	70 83
5	Sterilisation	18	15 00	102	85 00		
6	Incubation and uniform hatching	114	95 00	6	5 00		
7	Spacing of worms	109	90 83			11	9 17
8	Bed cleaning	117	97 57			3	2 50
9	Feeding	120	100 00	-			
10	Leaf storage	97	80 83	23	19 17		
11	Care at moulting	94	78 33			26	21 67
12	Temperature and R H regulations	36	30 00	51	42 50	33	27 50
13	Bed disinfection	39	32 50	62	51 67	19	15 83
14	Mounting and harvest	109	90 83	11	9 17		
15	Disease control	11	9 17	72	60 00	37	30 83

equipment moulting care sterilisation of rearing rooms and
appliances bed disinfection and disease control

Majority of the respondents had quite a good level of knowledge regarding the variety spacing irrigation cultural operations and leaf harvest With regard to silkworm rearing the practices like type of dfl incubation spacing of worms bed cleaning feeding leaf storage and mounting and harvest were observed to be known to majority of the farmers

A critical analysis of the above results showed that the sericulturists of these two districts in Kerala were mainly lagging in knowledge about the relatively complex practices like dosage of fertilizers plant protection of mulberry sterilisation measures and disease control of worms The knowledge of these practices necessitates comprehension retention and retrieval of the names of chemicals recommended dosages method of application, time of operations etc

Another major area in which farmers lack knowledge was about the basic requirements of sericulture like rearing house equipment number of dfls that can be reared per year per acre etc This is a matter of great concern because lack of knowledge about these basic factors will result in serious difficulties in planning the operations One of the consequences of this knowledge lag was reflected in their

under utilisation of available resources by the farmers Rearing of less number of dfls than which is actually possible results in wasting the mulberry leaves available in their farm This also results in the wastage of expenditure on rearing house equipments etc Thus most of the units were being run far below their potential resource and economic efficiencies One of the probable reasons for this might be the greater emphasis given by the trainers to the cultivation and rearing practices rather than to the planning and management aspects of sericulture enterprise

The observations pin point the need of emphasis to be given to the management aspects also together with the rearing and cultivation practices As an income generation activity for the rural youth and women the necessary entrepreneurship and management skill should be inculcated among the sericulturists For this the skill in planning and analysing the productivity cost of cultivation cost benefit comparison possibilities of business expansion etc should be developed among the sericulture trainees Bajapai et al (1993) had expressed similar views regarding the management aspects in sericulture It can be suggested that the training programmes should give equal importance to rearing and cultivation aspects plant protection and disease control

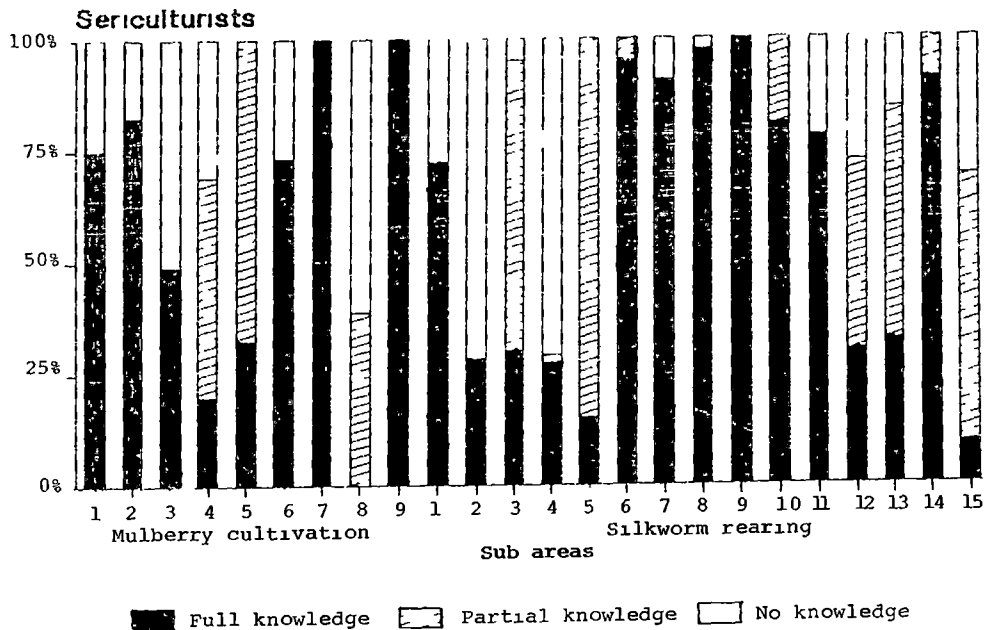


Fig 6 Sub-area wise knowledge level of sericulturists

measures and planning and management aspects The enterprise should be viewed and treated in a business perspective

4 3 Relationship of the independent variables with the dependent variables

The extent of adoption of a technology tends to be different from one individual to another It varies with their socio economic and personal characteristics availability of resources experience and other factors An analysis of these characteristics of the respondents of the present study was made to find out the possible relationship of these factors with the extent of adoption of recommended practices in sericulture and knowledge level

4 3 1 Profile of sericulturists

A cross sectional view of the different socio economic and personal characteristics of the respondent sericulturists is given in Table 8

It was found that the average area of mulberry garden was 1 25 acres Almost one third of the respondents had more than 1 25 acres of mulberry whereas the two third majority had only less than the average level Regarding the type of mulberry garden 54 17 per cent of the respondents were growing mulberry as an intercrop and the remaining 45 83 per

Table 8 Profile of sericulturists

		n 120			
No	Character	Average	Distribution	Frequency	Percentage
1	2	3	4	5	6
1	Area under mulberry cultivation	1 25 acres	More than 1 25 acre	42	35 00
			Less than 1 25 acre	78	65 00
2	Education level	3 81	High School or above	68	56 67
			Below High School	52	43 33
3	Family size	5 81	Large family	59	49 17
			Small family	61	50 83
4	Occupation	4 98	Agriculture	84	70 00
			Agriculture + sub occupation	13	10 83
			Agriculture as sub occupation	23	19 17
5	Land holding	5 48	Large farmers	40	33 33
			Small farmers	80	66 67
6	Credit utilization	3 84	Avalled loan	64	53 33
			Not availed loan	56	46 67
7	Family labour participation	71 00	Above average	75	62 50
			Below average	45	37 50
8	Leisure time availability	17 46 hours	More leisure time	51	42 50
			Less leisure time	69	57 50
9	Social participation	3 76	High participation	51	42 50
			Low participation	69	57 50
10	Labour availability	7 10	High availability	55	45 83
			Low availability	65	54 17
11	Innovativeness	3 37	More innovative	54	45 00
			Less innovative	66	55 00
12	Economic motivation	17 22	High motivation	66	55 00
			Low motivation	54	45 00
13	Risk orientation	14 49	High risk orientation	55	45 83
			Low risk orientation	65	54 17

Table 8 Continued

1	2	3	4	5	6
14	Extension linkage	15 97	Better linkage	61	50 83
			Less linkage	59	49 17
			Participated in one month training	102	85 00
15	Experience in sericulture	14 59	More experienced	39	32 50
			Less experienced	81	67 50
16	Annual income	34 000	High	41	34 17
			Low	79	68 33
17	Perception about sericulture	48 66	High perception	69	57 50
			Low perception	51	42 50
18	Attitude towards sericulture	23 68	High attitude	78	65 00
			Low attitude	42	35 00

cent had monocrop mulberry garden. Great majority (78.33%) of the gardens were irrigated and only one-fifth of the gardens were maintained under purely rainfed conditions.

The education level of the respondents was found to be fairly high and a considerable majority (56.67%) had education level of high school or above.

The family of the respondents had on an average 5.81 members. It was found that family size was having an equal distribution above and below average level (49.17% 50.83%).

For majority of the respondents (70%) agriculture was their only occupation and 10.83 per cent of the respondents had some other sub-occupation along with agriculture. But for 19.17 per cent agriculture was only a sub-occupation.

Two third of the respondents were small farmers with a total land holding not more than 5.48 acres which was the average level. The average irrigation facility was found to be 61.39 per cent. A little over half of the respondents had even higher irrigation facility whereas about one fifth of the respondents had no irrigation facility at all.

It was observed that more than half (53.33%) of the respondents had availed credit loan for sericulture while the

rest had utilised their own capital resources for investments in sericulture

The high dependence on family labour to meet the labour input requirement in sericulture was evident from the average family labour participation. It was found that the average family labour participation was as high as 71.00 per cent and a good majority of the respondents had the level of family labour participation at more than 71.00 per cent.

It was perceived by the respondents that the members of their family had an average leisure time of 17.46 hours per day which they utilise for sericulture and/or other activities.

The availability of hired labour was perceived to be almost high as indicated by the average score of 7.10. Almost half of the respondents had their perception lower than the average level.

It was found that the average score for social participation of the respondents was 3.76 and almost two-third of them had still lower participation in social organisations. It was observed that many of the sericulture farmer's co-operative societies originally formed were not functioning.

The average innovativeness score was 3.37. It was also found that 55.00 per cent of the respondents were less innovative than the other 45.00 per cent.

Economic motivation of the respondents was found to be fairly high as indicated by the average economic motivation score (17.22) and a considerable majority (55.00 %) of the respondents were highly motivated by profit.

The mean score for risk orientation was only 14.49 and the distribution of respondents was more towards the low risk orientation category.

The average extension linkage score was 15.97 and the respondents were almost equally distributed in the better linked and less linked groups. It was also found that 85 per cent of the sericulturists had participated in the one month sericulture training programme.

The respondents had an average experience level of 14.59 rearings. It is almost equal to an experience of three years. It was found that two-thirds of the respondents had only lesser experience whereas only one-third of the respondents had higher experience level.

It was found that on an average the annual income of the farmers from both agricultural and non agricultural

sources together was Rs 34 000/- But a good majority (65 83) of the respondents belonged to the low income group

The perception of the respondents regarding the practicability productivity and motivity of sericulture technology was found to be very high The average perception was 48 66 which was upto 81 00 per cent of the maximum score possible It was also found that 67 50 per cent of the respondents had even strong positive perception

It was found that most of the respondents had positive attitude towards sericulture The average attitude score was 23 68 and 65 00 per cent of the respondents belonged to the high attitude group and only 35 00 per cent belonged to low attitude group

4 3 2 Relationship of the independent variables with extent of adoption

4 3 2 1 Simple correlation analysis

Simple correlation analysis was carried out to find out the relationship between independent variables and extent of adoption of recommended practices in sericulture The results are furnished in Table 9 It is evident from the table that out of the 19 variables analysed 15 were found significantly correlated with extent of adoption Education

level family size land holding leisure time availability social participation innovativeness economic motivation risk orientation extension linkage experience in sericulture annual income perception about sericulture attitude towards sericulture and knowledge about recommended practices had significant positive relationship with extent of adoption Family labour participation was the only one variable which showed significant negative relationship with extent of adoption Variables like area under mulberry cultivation occupation credit utilisation and labour availability had no significant relationship with adoption

Knowledge is one of the three components of behaviour A change in the cognitive component may result in a change in the behaviour since there is a tendency to conform with the knowledge component This could be the possible reason for the observed positive relationship between knowledge and extent of adoption of recommended practices in sericulture Geethakutty (1982) opined that the knowledge of principle and procedure of a practice is important for the correct and prompt adoption of a technology The knowledge about the recommended practice may lead to the adoption unless the adoption was constrained by other factors This result had wide support from many research workers like Shivaraja (1986) Rathinasabapathy (1987) Krishnamoorthy (1988) Bonny (1990)



Table 9 Relationship between extent of adoption and independent variables
(n 120)

Variable No	Name of variable	Coefficient of correlation
X ₁	Area under mulberry cultivation	0 116 NS
X ₂	Education level	0 231 **
X ₃	Family size	0 246 **
X ₄	Occupation	0 090 NS
X ₅	Land holding	0 364 **
X ₆	Credit utilisation	0 079 NS
X ₇	Family labour participation	-0 420 **
X ₈	Leisure time availability	0 197 *
X ₉	Social participation	0 178 *
X ₁₀	Labour availability	0 079 NS
X ₁₁	Innovativeness	0 541 **
X ₁₂	Economic motivation	0 383 **
X ₁₃	Risk orientation	0 550 **
X ₁₄	Extension linkage	0 426 **
X ₁₅	Experience in sericulture	0 434 **
X ₁₆	Annual income	0 496 **
X ₁₇	Perception about sericulture	0 231 **
X ₁₈	Attitude towards sericulture	0 234 **
X ₁₉	Knowledge about recommended practices	0 659 **

* Significant at 5 per cent level NS Non significant

** Significant at 1 per cent level

Bhatia and Singh (1991) Jnanadevan and Prakash (1992) and Sulaiman and Prasad (1993)

The above observed relationship between knowledge level and extent of adoption highlights the need for strengthening extension measures and training methods to impart the knowledge input to sericulturists more effectively. Apart from the training given before starting sericulture there should be provisions for refreshing their knowledge from time to time and the farmers should be abreast with latest technologies especially in the area of disease control.

Education level of farmers was found to be positively related with extent of adoption. In sericulture the complex practices like disinfection of rearing rooms, plant protection, disease control etc. require quite a lot of comprehension from the part of sericulturists. Educated farmers obviously will be able to understand these practices and comprehend the importance of each practice for the success of sericulture. Hence the positive relationship between education level and extent of adoption could be justified. The studies of Thangaraju (1979), Prakashkumar (1986), Aswathanarayana (1989), Satheesh (1990) and Gopala (1991) also reported significant positive relationship between the two variables.

Sericulture is more like a family enterprise. The rearing of silkworms requires constant care and the family members can associate themselves in these activities, as it does not require much hard labour. This could be the probable reason for the observed positive relationship between family size and extent of adoption. This in turn reaffirms the appropriateness of sericulture to be adopted as a family enterprise.

In conformation with the results of Thangaraju (1979), Prakashkumar (1986), Satheesh (1990) and Gopala (1991), the present study also established a positive significant relationship between land holding and extent of adoption. According to Feder et al (1982), the relationship of land holding with adoption depends on such factors as fixed adoption cost, risk orientation, credit constraints, access to scarce inputs - water, fertilizer, plant protection chemical, etc. When the technology adoption requires large investments as fixed capital and credit constraints are binding with adoption of modern inputs like fertilizers, chemicals, equipments, etc., the adoption may be positively related to land holding. This suggests that capital may be more available with large farmers and they are more likely to adopt capital consuming packages than small farmers.

The leisure time availability was found positively related to extent of adoption as anticipated earlier. The leisure time availability of the family members determines how much time they can spend on subsidiary activities. Sericulture being a labour intensive activity requires a lot of man hours every day for feeding the worms, cleaning, disinfection, moulting care etc. This along with the family enterprise nature of sericulture explains the observed positive relationship between leisure time availability and extent of adoption.

Significant positive relationship was observed between social participation and extent of adoption. The participation of farmers in various social organisations like co-operative societies, group farming committees and other farmers organisations widens his opportunity to get information on improved practices. Knowing about the farming practices of other farmers promotes the copying behaviour of farmers. The social interaction model of diffusion of innovation (Havelock, 1969) suggests that most people wait until they discuss the innovation with others who already have experience with it before adopting the innovation by themselves. In the case of sericulturists also, social participation resulted in more access to information and enhanced confidence of the farmers. The co-operation that

exists among the members of an organisation and the pressures of group conformity also result in better adoption. Hence the positive relationship between social participation and extent of adoption was found reasonable. Similar results were reported by Prakashkumar (1986) and Aswathanarayana (1989).

While theorizing the typology of innovative farmers Rogers and Shoemaker (1971) postulated that the inquisitiveness and curiosity arising out of a farmer's search for efficient and latest farm technologies leads him to gather enough knowledge on improved practices. This phenomenon could well explain the positive relationship between innovativeness and extent of adoption. Sericulture technology as such being an innovation to the people of Kerala necessitates the acceptance and readiness of the farmers to adopt it. The positive relationship obtained in this study is in line with the results obtained by Chenniappan (1987), Jayaraman (1988) and Krishnamoorthy (1988).

Risk and uncertainty are prominent and unavoidable in sericulture. There is every chance for losing a good batch of worms at any time due to diseases, weather changes, shortage of leaves as against anticipated requirement etc. Uncertainty prevails regarding the availability of layings, market of cocoon and other factors like personal convenience. Hence decision making becomes very difficult in sericulture.

enterprise (Bajpai et al 1993) The risk orientation of the sericulturists plays an important role on their decision making ability regarding the adoption of various recommendations thereby establishing positive relationship between risk orientation and extent of adoption Thangaraju (1979) had reported similar relationship between the two variables thus confirming the present result

Economic motivation was found to have positive relationship with extent of adoption in sericulture Thangaraju (1979) Prakashkumar (1986) and Aswathanarayana (1989) also had reported positive relationship between economic motivation and extent of adoption in sericulture Economic motivation with its increased focus on profit maximisation necessitates increased production In sericulture a good harvest is ensured only if proper package of practices in mulberry cultivation and silkworm rearing are adopted in correct time and quantity The chances of loss of crop will be very high if the farmer failed in adopting proper disinfection cleaning feeding etc This relationship was evident from the positive correlation of economic motivation with extent of adoption

The role of extension system is to ensure that the knowledge and skill of farmers are continually enriched through their access to the development in agricultural

research The farmers who had better linkage with various extension and information sources will have more knowledge on recommended practices In Kerala the extension services of Department of Agriculture or sericulture wing of the KVIB are not confined to providing technical advice and information, but they also help the client system in acquiring inputs and credit facilities and giving various incentives Hence the observed positive relationship of extension linkage with extent of adoption is substantiated Similar results giving positive relationship between extension linkage and extent of adoption were observed by Thangaraju (1979) Krishnamoorthy (1984) Jayakrishnan (1984) and Bony (1990)

Experience helps the sericulturists to acquire more knowledge with regard to the how to do aspect of the recommended practices Also the experienced sericulturists will have a better evaluation of the different practices in sericulture and will be more prompt in adopting different practices in time This was well established by the positive relationship between experience in sericulture and extent of adoption This was supported by the studies of Thangaraju (1979) Krishnamoorthy (1984) and Bonny (1990)

It was found that annual income of the sericulturists was positively related to extent of adoption Sericulture necessitates a lot of investment as fixed cost as well as

operational cost Obviously the respondents with higher annual income can only afford the investments in time At the same time the economically backward farmers will have difficulty in incurring the costs of inputs like fertilizers labour plant protection chemicals and so on Thangaraju (1979) Viju (1985) Anithakumari (1989) Agarwal and Arora (1989) and Bhatia and Singh (1991) had also reported positive relationship between annual income and extent of adoption of agricultural technologies

It was found that perception about sericulture had positive relationship with extent of adoption When a farmer perceives an innovation as practicable productive and motivating in his condition it is more likely that he adopts it (Murthy et al , 1973) The perception about the innovation also determines the farmer s attitude towards the innovation The relationship between perception and attitude was established by Latha (1990) The positive attitude results in adoption of the technology Hence the positive relationship between perception about sericulture and extent of adoption is justified

It was found that attitude towards sericulture had positive relationship with extent of adoption Attitude is the result of the respondent s perception, knowledge and first hand experience with sericulture Attitude being a component

of behaviour a favourable attitude will lead to a favourable behaviour unless the behaviour is restricted by other external or internal factors Hence the positive relationship between attitude towards sericulture and extent of adoption could be justified Positive relationship between attitude and adoption was also reported by Reddy (1987) Chandra and Singh (1992) Singh et al (1992) and Sulaiman and Prasad (1993)

Contrary to the expectation it was found that family labour participation had significant negative relationship with extent of adoption of recommended practices Sericulture is a labour intensive enterprise as stated earlier Because of the high cost of labour and unattractive market price for cocoons the sericulture enterprise will turn as a loss if the required labour was met through only hired labour This might have made the sericulturists more dependent on family labour Hence the family labour participation indirectly denotes the avoidance of hired labour and adjusting with the family labour But a negative consequence of this trend was the dilution of technology or lower level adoption of the recommended practices than the required and potential level The number of split application of fertilizers regular pruning and cultural operations number of rearings per year number of dfls per rearing regular disinfection measures

used etc were limited and/or adjusted to the convenience of the family members This might have resulted in the negative relationship between family labour participation and extent of adoption

Area under mulberry cultivation credit utilisation labour availability and occupation had no significant relationship with extent of adoption

The relation between area under mulberry cultivation and extent of adoption was found to be statistically not significant This result was contradictory to the results obtained by Satheesh (1990) and Gopala (1991) It was found that in the present study about 65 00 per cent of the respondents had an area of less than 1 25 acres under mulberry cultivation Hence the variability was very limited Further the area under mulberry cultivation was not a determinant of the socio-economic status of the farmer Most farmers had grown mulberry to an extent which was convenient to them This association is expressed in the form of non significant relationship between area under mulberry cultivation and extent of adoption

It was found that more than 50 per cent of the respondents had availed credit loan for sericulture and the rest of the respondents had not availed the loan because they

do not perceive the need for it. This was proved by the constraint analysis where the respondents had perceived lack of credit facility as the least important constraint. Hence the non significant relationship between credit utilisation and extent of adoption is understandable.

Labour availability was found to have no significant relationship with extent of adoption. In sericulture the general orientation is towards family labour and not towards hired labour. Hence availability of hired labour was not a determinant in adoption. Further it could be noted that it was not the availability but the cost incurred by the hired labour which determines the utilisation of labour. This was evident from the analysis of constraints where non availability of labour was ranked as one of the least important constraints while high labour cost was ranked as the fourth important constraint.

4.3.2.2 Step-down regression analysis

The step down regression analysis was employed to identify the best set of variables that could predict the dependent variable. The variables which had significant correlation with extent of adoption were used for this analysis and the results are presented in Table 10.

Table 10 Results of step-down regression analysis of extent of adoption on significant independent variables (n 120)

Step No	Variables for regression	Multiple regression coefficient (R)	R ²	F value
	X ₂ X ₃ X ₅ , X ₇			
Step 1	X ₈ X ₁₀ X ₁₁ X ₁₂ X ₁₃ X ₁₄ X ₁₅ X ₁₆ X ₁₇ X ₁₈ and X ₁₉	0 7729	0 5974	10 29** (15 104)
Step 2	Down X ₁₂	0 7728	0 5973	11 12** (14 105)
Step 3	Down X ₁₇	0 7726	0 5970	12 08** (13 106)
Step-4	Down X ₁₅	0 7723	0 5964	13 18** (12 107)
Step-5	Down X ₂	0 7719	0 5958	14 47** (11 108)
Step 6	Down X ₁₄	0 7710	0 5944	15 97** (10,109)
Step-7	Down X ₉	0 7701	0 5930	17 81** (9 110)
Step 8	Down X ₅	0 7692	0 5917	20 11** (8 111)
Step 9	Down X ₇	0 7682	0 5901	23 04** (7 112)
Step-10	Down X ₁₈	0 7664	0 5873	26 80** (6 113)
Step 11	Down X ₃ (Remaining variables are X ₈ X ₁₁ X ₁₃ X ₁₆ and X ₁₉)	0 7653	0 5858	32 24** (5 114)

** Significant at 1 per cent level

It was found that out of the total variation of 59.73 per cent by all the significant variables, 58.58 per cent was contributed by five variables viz , leisure time availability, innovativeness, risk orientation, annual income and knowledge about recommended practices. Thus these five variables could be considered as the best in predicting the extent of adoption of recommended practices by sericulturists.

4.3.2.3 Path analysis

Path coefficient analysis was employed to find out the direct and indirect effects of the significant independent variables on extent of adoption. The results are presented in Table 11.

It was found that knowledge (x_{19}) had the maximum direct effect on extent of adoption followed by innovativeness (x_{11}), annual income (x_{16}) and risk orientation (x_{13}). The positive significant relationship of these variables with extent of adoption were already discussed. It was evident that these variables were mainly responsible for the adoption behaviour. The variables leisure time availability (x_8), family size (x_3), attitude (x_{18}), experience (x_{15}) and perception (x_{17}) also had positive direct effect and positive correlation. The variable family labour participation had the maximum negative direct effect and was responsible for the

Table 11 Direct and indirect effects of significant independent variables
on extent of adoption

n 120

No	Variable	Direct effect	Maximum indirect effect direct through		
			(1)	(2)	(3)
X ₂	Education	0 0016	0 1283 (x ₁₉)	0 0447 (x ₁₁)	0 0431 (x ₁₆)
X ₃	Family size	+0 0637	0 0507 (x ₈)	0 0473 (x ₁₁)	0 0434 (x ₁₉)
X ₅	Land holding	0 0417	0 1370 (x ₁₉)	0 1023 (x ₁₆)	0 0585 (x ₁₁)
X ₇	Family labour participation	0 0903	0 1676 (x ₁₉)	0 0836 (x ₁₆)	0 0662 (x ₁₃)
X ₈	Leisure time availability	0 0956	0 0338 (x ₃)	0 0245 (x ₁₁)	0 0179 (x ₁₆)
X ₉	Social participation	0 0403	0 0614 (x ₁₁)	0 0519 (x ₁₉)	0 0250 (x ₁₃)
X ₁₁	Innovativeness	0 1894	0 1373 (x ₁₉)	0 0842 (x ₁₃)	0 0481 (x ₁₆)
X ₁₂	Economic motivation	0 0178	0 1533 (x ₁₉)	0 1019 (x ₁₁)	0 0775 (x ₁₃)
X ₁₃	Risk orientation	0 1562	0 1928 (x ₁₉)	0 0972 (x ₁₁)	0 0663 (x ₁₆)
X ₁₄	Extention linkage	0 0526	0 2066 (x ₁₉)	0 0699 (x ₁₁)	0 0721 (x ₁₃)
X ₁₅	Experience in sericulture	+0 0314	0 1367 (x ₁₉)	0 1188 (x ₁₆)	0 0570 (x ₁₁)
X ₁₆	Annual income	0 1589	0 1632 (x ₁₉)	0 0652 (x ₁₃)	0 0343 (x ₁₁)
X ₁₇	Perception about sericulture	0 0237	0 1006 (x ₁₉)	0 0144 (x ₁₁)	0 0267 (x ₁₆)
X ₁₈	Attitude towards sericulture	0 0501	0 1123 (x ₁₉)	0 0356 (x ₁₆)	0 0310 (x ₁₃)
X ₁₉	Knowledge about recommended practices	0 4116*	0 0860 (x ₁₉)	0 0732 (x ₁₃)	0 0630 (x ₁₆)

* Maximum direct effect

observed negative correlation. The remaining variables had negative direct effect on extent of adoption.

It could be seen that the effects of most of the independent variables were routed through knowledge (x_{19}), innovativeness (x_{11}), annual income (x_{16}) and risk orientation (x_{13}).

The present result together with the results of step down regression analysis establish the importance of the five variables viz. leisure time availability, annual income, knowledge about recommended practices, innovativeness and risk orientation. It could be stated that farmers who had the knowledge about the recommended practices, supported by a good financial background to meet the costs incurred and with enough leisure time are likely to be the better adopters of the recommended practices in sericulture. It could also be interpreted that a readiness on the part of the respondent to accept and adopt innovation and a positive approach towards risks hasten the adoption process.

4.3.3 Relationship between independent variables and knowledge level of sericulturists

4.3.3.1 Simple correlation analysis

The type and intensity of relationship between the

selected independent variables and knowledge level of the sericulturists were found out by computing the simple correlation coefficients and the results are presented in Table 12

A perusal of Table 12 revealed that out of the 14 variables included for the simple correlation analysis 10 variables had positive significant relationship with the knowledge level of sericulturists. These variables were education level, land holding, innovativeness, economic motivation, risk orientation, extension linkage, experience in sericulture, annual income, perception about sericulture and attitude towards sericulture.

The variables with no significant relationship with knowledge level of sericulturists were area under mulberry cultivation, family size, occupation and social participation.

The two major activities of sericulture, namely mulberry cultivation and rearing of silkworms, involve several complicated processes. This makes the sericulturists to acquire the required knowledge and skill from the direct guidance by sericulture extension officers during the training programmes and through regular supervision by the sericulture field assistants of KVIB. Contact with various sources of information by the sericulturists, field visits and on farm

Table 12 Relationship between knowledge level of sericulturists about recommended practices in sericulture and selected independent variables

(n=120)

Variable No	Name of variable	Coefficient of correlation
X ₁	Area under mulberry cultivation	0.102 NS
X ₂	Education level	0.312 **
X ₃	Family size	0.105 NS
X ₄	Occupation	0.056 NS
X ₅	Land holding	0.333 **
X ₆	Social participation	0.126 NS
X ₇	Innovativeness	0.455 **
X ₈	Economic motivation	0.372 **
X ₉	Risk orientation	0.468 **
X ₁₀	Extension linkage	0.502 **
X ₁₁	Experience in sericulture	0.332 **
X ₁₂	Annual income	0.397 **
X ₁₃	Perception about sericulture	0.245 **
X ₁₄	Attitude towards sericulture	0.274 **

** Significant at 1 per cent level

NS Non-significant

guidance given by the extension agencies as well as utilisation of mass media sources contribute to substantial knowledge gain in the sericulturists. Hence significant positive correlation was observed between the extension linkage and knowledge level. Similar results established by Aswathanarayana (1989) and Satheesh (1990) support the present finding.

It was found that education level had positive relationship with knowledge level of sericulturists. Education level is an indication of the comprehending and understanding power of the individual. Aswathanarayana (1989) and Satheesh (1990) also had reported positive relationship between education level and knowledge of silkworm rearers.

The effect of land holding on knowledge level was mostly directed through the better access to information, higher education level and annual income (Feder et al 1982). This shows that large farmers will have more power to acquire knowledge and comprehend the knowledge. This resulted in the positive relationship between the two variables. This result was in conformation with the results reported by Aswathanarayana (1989) and Satheesh (1990).

In line with the results obtained in earlier studies by Rathinasabapathy (1987), Chenniappan (1987) and Jayaraman

(1988) the present study also established significant positive relationship between innovativeness and knowledge level. The traditional farmers who are not ready to adopt new technologies may not be receptive to such knowledge so as to avoid the disequilibrium arising out of the new knowledge. On the other hand innovative farmers are characterised by their eagerness for new information and information seeking behaviour.

It was found that economic motivation and knowledge level of sericulturists were positively related. Farmers who are economically motivated may seek all the measures to maximise their profit. Careful adoption of different recommended practices is necessary to get the maximum profit from sericulture. Hence they will be motivated to seek the correct recommendations and this leads to good knowledge about the practices. Hence the positive relationship between the two variables observed is justifiable. This result was supported by the findings of Aswathanarayana (1989) and Ingle et al (1991).

Risk orientation was found positively related with knowledge level of sericulturists. The positive attitude towards risks prepares the respondents to gather all possible knowledge regarding the ways to control the risk. This results in a better knowledge about the recommended practices.

These might be the reason for the positive relationship of knowledge level with risk orientation. Similar results were reported by Jayakrishnan (1984) and Rathinasabapathy (1987).

The more experienced farmers have more possibility to gain increased understanding on the recommended practices through varied real experiences. The positive relationship found between knowledge level and experience in sericulture is self explanatory. Positive significant relationship between the two variables was observed by Jayakrishnan (1984) also.

Income of the farmer is an indication of the socio-economic status. The wealthier farmers will have better access to information through mass media and other sources. The accessibility to information along with high risk orientation and innovativeness result in better knowledge for respondents with higher annual income. Hence annual income had positive significant relationship with knowledge level.

From the Table 12 it could be seen that perception about sericulture and attitude towards sericulture had positive significant relationship with knowledge level. The respondents who had favourable perception about the practicability, productivity and motivity of sericulture would have positive attitude towards sericulture. People always tend to collect more information on matters towards which they

are in agreement and avoid information with which they are in disagreement. This translation from affective component through the cognitive component before taking shape into definite action is a feature of human behaviour. Hence perception about sericulture and attitude towards sericulture had positive relationship with knowledge level.

It was found that area under mulberry cultivation had no significant relationship with knowledge level of respondents. This result was contradictory to the finding of Satheesh (1990). The finding of the present study could be explained by the fact that area under mulberry cultivation did not represent the socio-economic status of the sericulturists as sericulture in many cases were only their subsidiary occupation. Irrespective of area under mulberry cultivation respondents had equal chances of getting information through the extension system. Hence the non significant relationship between the two variables can be substantiated.

Family size was found to be not significantly related with knowledge level. Usually the major worker on sericulture within a family will be responsible for gaining knowledge about the recommended practices. Sericulture not being a traditional farm activity the members of the family other than the one who participated in the training programme need not possess an indepth knowledge on various activities. This

may be the reason for the observed non significant relationship

Occupation of the respondent had no significant relationship with their knowledge level. The highly sensitive and risky nature of sericulture necessitates a minimum level of knowledge by all farmers who are taking up this enterprise. This might have resulted in a non significant relationship between occupation and knowledge level. Social participation and knowledge level of respondents were found to be positively but non significantly related.

4.3.3.2 Step-down regression analysis

The step down regression analysis was employed to identify the best set of variables for predicting the knowledge level of respondents. Those variables which had significant relation with knowledge level were used for this analysis and the results are presented in Table 13.

It was found that all the significant variables together accounted for 41.31 per cent of the variation in knowledge level of sericulturists. Out of this 40.22 per cent variation was accounted with five variables viz education level, innovativeness, risk orientation, extension linkage and attitude towards sericulture. The results showed

Table 13 Results of step-down regression analysis of knowledge level of sericulturists on significant independent variables

(n 120)

Step No	Variables for regression	Multiple regression coefficient (R)	R ²	F value
Step 1	X ₂ X ₅ X ₇ X ₈ X ₉ X ₁₀ , X ₁₁ X ₁₂ X ₁₃ and X ₁₄	0.6428	0.4131	7.67** (10, 109)
Step 2	Down X ₅	0.6427	0.4130	8.60** (9, 110)
Step-3	Down X ₁₁	0.6422	0.4124	9.74** (8, 111)
Step-4	Down X ₁₃	0.6416	0.4117	11.20** (7, 112)
Step-5	Down X ₈	0.6396	0.4091	13.04** (6, 113)
Step 6	Down X ₁₂ (Remaining variables are X ₂ X ₇ X ₉ X ₁₀ and X ₁₄)	0.6342	0.4022	15.34** (5, 114)

** Significant at 1 per cent level

that these five variables were the best predictors of the knowledge level of the respondents

4.3 3 3 Path analysis

The direct and indirect effects of the significant variables were analysed through path analysis technique. The results are given in Table 14

It can be seen that maximum direct effect on knowledge was by extension linkage (X_{10}) Education level (X_2) innovativeness (X_1) risk orientation (X_9) attitude towards sericulture (X_{14}) and annual income (X_{12}) also had high direct effect on knowledge. These variables had positive correlation and positive direct effect on knowledge. Hence it was evident that these variables were mainly responsible for the knowledge level of the respondents. The variables perception about sericulture (X_{13}) and economic motivation (X_8) also had positive direct effect on knowledge. Land holding (X_5) and experience in sericulture (X_{11}) had negative direct effect even though they had positive correlation with knowledge.

An analysis of the result in Table 14 indicate that most of the indirect effects of independent variables were routed through X_{10} (extension linkage) X_{12} (annual income) X_9 (risk orientation) and X_{14} (attitude towards sericulture)

Table 14 Direct and indirect effects of significant independent variables on knowledge level of sericulturists

(n - 120)

No	Variable	Direct effect	Maximum indirect effect directed through		
			(1)	(2)	(3)
X ₂	Education	0 1516	0 0485 (x ₁₀)	0 0369 (x ₁₂)	0 0347 (x ₇)
X ₅	Land holding	-0 0151	0 0894 (x ₁₀)	0 0875 (x ₁₂)	0 0615 (x ₂)
X ₇	Innovativeness	0 1470	0 1322 (x ₁₀)	0 0781 (x ₉)	0 0412 (x ₁₂)
X ₈	Economic motivation	0 0557	0 0931 (x ₁₀)	0 0719 (x ₉)	0 0699 (x ₇)
X ₉	Risk orientation	0 1449	0 1187 (x ₁₀)	0 1792 (x ₇)	0 0568 (x ₁₂)
X ₁₀	Extension linkage	0 2572*	0 0756 (x ₇)	0 0669 (x ₉)	0 0552 (x ₁₂)
X ₁₁	Experience in sericulture	-0 0451	0 1017 (x ₁₂)	0 0977 (x ₁₀)	0 0544 (x ₇)
X ₁₂	Annual income	0 1360	0 1044 (x ₁₀)	0 0605 (x ₉)	0 0445 (x ₇)
X ₁₃	Perception about sericulture	0 0406	0 0833 (x ₁₄)	0 0399 (x ₁₀)	0 0266 (x ₇)
X ₁₄	Attitude towards sericulture	0 1363	0 0304 (x ₁₂)	0 0288 (x ₉)	0 0274 (x ₁₀)

* Maximum direct effect

The results of step-down regression analysis and path analysis clearly established the prominence of the role played by extension linkage in imparting the knowledge about recommended practices to the sericulturists. The education level, innovativeness, risk orientation, attitude towards sericulture and annual income of the respondents were also important factors influencing the knowledge level of the sericulturists.

As it was found that 51.66 per cent of the respondents belonged to poor and low knowledge group, there is need for further strengthening the extension linkage. Sericulture being a new enterprise in the state, the extension link is the only way for sericulturists to get information. Hence concentrated efforts have to be taken by the extension agencies in disseminating the information regarding recommended practices as well as improved methods and new technologies in the field of sericulture to the farmers.

4.4 Factors which motivated the sericulturists to take up sericulture

4.4.1 Motivational factors

An attempt was made to find out the possible factors which motivated the respondents to take up sericulture. It was identified that profitability of sericulture enterprise

was the most important factor which made the respondents interested in sericulture and influenced them to take up this enterprise. Possibility of getting subsidies and other incentives, monthly distributed income, generation potential for self employment, feasibility as a family enterprise and availability of loan were other important factors which motivated the respondents. The factors like manageability by farm women, adaptability to small farm conditions, novelty of the enterprise, interesting as a hobby and elevation in social status could get only low rating (Table 15).

Right from the introduction of sericulture in Kerala, the promotional agencies had highlighted the profitability of this enterprise. It had been reported by Jalihal (1974) that one acre of mulberry cultivation under irrigation combined with silkworm rearing could give at least Rs 10 000 annual income to the family. Reddy (1985) had worked out the net return from sericulture in Tamil Nadu as Rs 8025 per acre compared to Rs 3082/- per acre for alternate crops. The cost-return analysis of sericulture in Kashmir by Shah (1993) had showed that the net income from sericulture was Rs 10 607 per acre. In this background, the present observation of profitability as the first motivating factor was found quite understandable. Sanjeev (1987) and Anilkumar (1988) had also

Table 15 Factors which motivated the sericulturists to adopt sericulture technology

(n 120)

No	Factors	Rank order
1	Profitability of sericulture	1
2	Possibility of getting subsidy and other incentives	2
3	Monthly distributed income	3
4	Potential for self employment	4
5	Feasibility as a family enterprise	5
6	Availability of credit loan	6
7	Manageability by family women	7
8	Adaptability to small farm conditions	8
9	Novelty of enterprise	9
10	Interesting as a hobby	10
11	Elevation in social status	11

reported economic motive as the most important factor directing the behaviour of farmers

Subsidies and other incentives had become a part of transfer of technology. In the case of sericulture also these factors had played a major role in motivating the farmers.

The monthly distributed income generation was also an attraction which motivated many of the respondents. Respondents who were in need of an activity to engage themselves were motivated by the factors like self employment potential, family enterprise nature and manageability by farm women. Essentiality of larger initial investments acts as a serious limitation for the adaptability of sericulture technology under small farm conditions. Hence the possibility of getting credit loan was also a motivating factor.

An overview of the results indicated that the economic motive played the most important role in the adoption of sericulture. Similarly employment (employment generation scope for self, family and farm women) motive and incentives were also important.

4.4.2 Motivating agents

A further investigation about the possible agents who

had motivated the farmers to adopt sericulture revealed that in the initial stages of adoption process the greatest influence was by neighbouring sericulturists who had started sericulture earlier, followed by mass media sources. In later stages the extension agents of KVIB had the most prominent role. The details of the different motivating agents and the frequency of farmers influenced by them are given in Table 16.

In the initial stages of adoption process like awareness and interest the sericulture farmers who had already taken up this enterprise and mass media sources especially radio, were the important sources of information to the respondents. The farmers were actually attracted towards sericulture by observing the success of neighbouring sericulturists. In later stages before adopting sericulture the respondents had discussed the project with extension agents of KVIB and participated in training programme conducted by them.

According to Rogers and Schoemaker (1971) the early adopters are always looked upon as good sources of advice and information by the neighbours. Swamy and Jalihal (1990) reported that 86.67 per cent of the farmers who had adopted a biogas plant successfully had seen a successful plant before installing one in their farm. Arulraj and Perumal (1991) reported that fellow farmers were the important source of

Table 16 Motivational agents for the adoption of sericulture technology

(n - 120)

No	Agent	Frequency of farmers motivated	
		Initial stages	Later stages
1	Friends	10	18
2	Family members	6	0
3	Early adopters of sericulture	46	19
4	Extension workers of NGO	5	7
5	Extension workers of KVIB	8	54
6	Extension workers of NSP	5	14
7	Mass media	40	8

information to medium and high thresholded adopters with regard to the adoption of improved sugarcane variety. It was found in the present study also that the influence by the successful sericulture farmers was very important in encouraging the adoption of the technology.

The role of mass media and extension workers was also unquestionable. The mass media had attracted widespread attention of the potential adopters and the extension agencies had supported them with necessary knowledge and confidence to adopt the technology.

4.5 Constraints in adoption of sericulture enterprise

The major constraints felt by the respondents in their sericulture enterprise are presented in Table 17. The rankings of the constraints represent the severity of the constraint as perceived and expressed by the respondents.

On the whole, the most important constraint perceived by the respondents was low price of cocoon. Brown (1966) opined that favourable prices for the farm products are the important incentives for adoption. Favourable price may mean favourable with respect to past price levels, with respect to prices of similar products in other countries, or in relation to the purchased inputs of production. In the case of sericulture, the farmers had a perception that they were not

Table 17 Constraints in sericulture adoption as perceived by the sericulturists

(n = 120)

No	Constraints	Cumulative Score	Rank
1	Low price of cocoon	286	1
2	High cost of fertilizer	279	2
3	Unfavourable climatic conditions	226	3
4	High labour cost	219	4
5	Lack of sufficient marketing facilities	163	5
6	Incidence of diseases and mortality of worms	160	6
7	Lack of satisfactory measures to control diseases	131	7
8	Lack of irrigation facility	110	8
9	Inadequate floor price which still is not available to most of the producers	101	9
10	Discrimination of outsiders in Coimbatore market	93	10
11	Lack of sufficient manpower to give proper care to the worms	65	11
12	Difficulties in getting good quality dfls	56	12
13	Non availability of labourers	47	13
14	Non availability of credit loan	41	14

getting a favourable price for the cocoons in relation to the cost involved in labour fertilizer and other inputs Further the respondents pointed out that those who could fetch Rs 180 225 per kilogram of cocoon in the year 1991-92 had to face a price as low as Rs 28/- per kilogram in 1992-93 and 1993-94 Also they believed that the price they are getting is the lowest when compared to the price of cocoons in neighbouring states like Tamil Nadu or Karnataka All these factors might have contributed towards the perception that low price of cocoon as the most important constraint Reddy (1985) also reported that low price of cocoon was an important constraint

This result points towards the need for fixing floor prices in accordance with the cost of production and market support and market control by the governmental agencies to control the fluctuations in price

High cost of fertilizers was ranked as the second important constraint The basis of silkworm rearing is the mulberry leaf production The healthy growth of mulberry and year round availability of leaves can be ensured only through good management of mulberry garden with proper doses of fertilizers Usually the farmers had to apply fertilizers after each leaf harvest The prices of fertilizers have almost doubled in the recent past This was a major problem

to the sericulturists and they perceived this as the second most important constraint

The rearing of silkworms is a process which is very much liable to the external environment. It was found that both the heavy rainfall during the monsoon as well as the hot summer are not suited for rearing the worms. Most of the farmers are unaware about the measures to regulate temperature and relative humidity in the rearing rooms. Even if they possess the technology they find it as very difficult to regulate the temperature and relative humidity. This results in increased disease incidences and reduction in the number of rearings per year. Hence the unfavourable climatic conditions getting ranked as third among the constraints is quite understandable. This result emphasises the need for imparting skill to the sericulturists in effective regulation of temperature and relative humidity.

Marihomnaiah (1986) reported that cost of human labour and cost of mulberry leaf production contributed major share of the cost of cocoon production. On an average sericulture requires 480 mandays. Eventhough a major share of the labour work is carried out by family labour there is still need for depending on hired labour if other resources are to be utilised for the maximum potential. Compared to other states of the country the wage rate of agricultural labourers are

the highest in Kerala (Directorate of Economics and Statistics 1993) Almost all the respondents opined that with the existing price of cocoons sericulture enterprise with hired labour utilisation will be a big loss Hence the sericulturists prefer to leave the available resources under utilised rather than to increase their labour inputs

At present there is no cocoon market in Kerala The nearest market is in Coimbatore or Mysore To remove the difficulties of sericulturists in marketing KVIB had started collecting the cocoons from the farmers and selling it at Mysore In this system the farmers have to hand over their cocoons to office of the KVIB for which they will be receiving the price after a week only This necessitates synchronised rearing by all the silkworm rearers throughout the district and harvesting of the cocoons simultaneously Otherwise the rearer has to find out his own way to sell the cocoons Eventhough the farmers consider the effort of KVIB as a great help for them, actually the sericulturists of Kerala are denied of their chance of selling their products in the market at a better price The lack of adequate marketing facilities had been reported as an important constraint of sericulturists by Reddy (1985) Babu (1988), Aswathanarayana (1989) and Tikoo (1989)

Incidence of silkworm diseases causing high mortality of the worms and lack of satisfactory measures to control the diseases were also perceived as important constraints. The diseases affecting silkworms are infectious and are not easily detectable by the rearers. In most cases the diseases result in a total failure of the crop or very poor outcome. It was not easy for the rearers to adjust with such failures and total loss especially at the final stage after having put in so much of their time, effort, labour and investment in addition to the heavy consumption of leaves. Most of the respondents were of the opinion that there were no satisfactory control measures probably due to the lack of awareness and lack of confidence in the recommended methods. Thangaraju (1979), Aswathanarayana (1989), Gopala and Krishna (1993) and Raveendran et al (1993) also had reported similar results regarding disease incidence and lack of control measures. This highlights the need for educating the rearers about the possible management practices to contain and control the diseases to a minimum possible level.

Mulberry is a crop that responds instantly to water input. Irrigation makes a lot of difference in sericulture since that alone can double the mulberry leaf production (Benchamin 1993). It was found that almost 21.67 per cent of the respondents had no irrigation facility. Hence, lack of

irrigation facility was also ranked as an important constraint Aswathanarayana (1989) and Gopala and Krishna (1993) also had reported lack of irrigation facility as a constraint in sericulture

The state government had fixed the floor price of cocoon at Rs 70/- per kilogram But it is based on quality of cocoons The farmers were not satisfied with the floor price and pricing system They perceived that the floor price was inadequate while considering the cost incurred in production of cocoons It was also felt by the sericulturists that they did not get a fair treatment from traders in Coimbatore market They were always accused of poor quality cocoons with broken threads and low silk percentage so that the cocoons fetch only a second grade price

Lack of sufficient manpower to give proper care to the worms difficulties in getting good quality dfls non availability of labourers and non availability of credit loan were not perceived as important constraints by many of the respondents As sericulture is by and large considered as a family enterprise the sericulturists were not experiencing any major limitation regarding the manpower requirement and labour availability The constant involvement of KVIB in the industry ensure the availability of dfls to the rearers in time Hence non availability of dfls was not a problem to

many of the sericulturists. It was observed that 53.33 per cent of the respondents had availed loan for sericulture. The rest of the respondents were either not in need of loan or averse to take loan. Therefore non availability of loan was not actually felt as a problem for the respondent sericulturists.

It was observed that the respondents had perceived economic constraints and marketing difficulties as the most important constraints now prevailing in the field of sericulture. It could be noted that out of the first ten constraints six were related to these areas. They perceived that while the prices of inputs were high the price of the produce was low and there was no adequate marketing facility. The greatest stimulus to enhance the adoption of a technology is the existence of a guaranteed market which can provide a remunerative and stable price to the producer. Thus the analysis of constraints points to the fact that the sericulture sector in Kerala needs immediate steps to strengthen the essential infrastructural facilities to make available the production supplies at reasonable cost to make sure suitable marketing facilities and to ensure reasonable price for the cocoons.

4.6 Reasons for non-adoption of sericulture enterprise by prospective sericulturists

Considerable efforts had been made for the popularisation of sericulture in Kerala in recent past with noteworthy results. Still a lot of farmers who initially came forward with an enthusiasm to start sericulture and participated in the training programmes had not started this enterprise.

For analysing the probable reasons for non-adoption a comparative analysis of the selected characteristics of the sericulturists and prospective sericulturists were made.

4.6.1 Comparative profile analysis of the sericulturists and prospective sericulturists

A comparison of the mean values of the selected characteristics of the sericulturists and prospective sericulturists is presented in Table 18.

It was observed that the two categories of farmers were significantly different for most of the characteristics studied except for landholding, labour availability and annual income. The mean values indicate that the prospective sericulturists had higher education level and had an occupational status more towards non agricultural occupation.

Table 18 Comparative profile analysis of sericulturists and prospective sericulturists

No	Selected characteristics	Sericulturists Mean (n-120)	Prospective sericulturists Mean (n-60)	t value
1	Education level	3 81	4 30	2 337*
2	Family size	5 87	4 90	2 903**
3	Occupation	4 98	4 10	2 878**
4	Landholding	5 48	4 39	5 519NS
5	Leisure time availability	17 46	8 45	8 788**
6	Social participation	3 76	2 45	2 643**
7	Labour availability	7 10	6 53	1 930NS
8	Innovativeness	3 37	2 51	4 019**
9	Economic motivation	17 22	15 08	3 617**
10	Risk orientation	14 49	12 52	3 153**
11	Extension linkage	15 97	7 95	9 485**
12	Annual income	34 00	27 67	1 292NS
13	Perception about sericulture	48 66	34 93	16 318**
14	Attitude towards sericulture	23 68	17 10	7 872**

* Significant at 5 per cent level

** Significant at 1 per cent level

NS Nonsignificant

The mean values of family size, leisure time availability, social participation, innovativeness, economic motivation, risk orientation, extension linkage perception about sericulture and attitude towards sericulture were lower for prospective sericulturists

The smaller family size and lesser leisure time availability of the non-adopters reduced the chance for taking up sericulture as a family enterprise. The social participation and extension linkage could help the farmers to build up better attitude and perception about the technology. But the non-adopters had significantly lower social participation and extension linkage than the adopters. Murthy et al (1973) had discriminated the adopters and non-adopters of an innovation based on their perception about the innovation. In the present study it was found that the prospective sericulturists had significantly different perception about the practicability, profitability and motivity of sericulture, compared to sericulturists. The difference was significant in the case of attitude towards sericulture also. The low attitude and perception about sericulture might have resulted in the non-adoption of sericulture.

It was also found that the non-adopters had low innovativeness than the adopters. This also might have

contributed to their non-adoption behaviour Latha (1990) reported that the adopters and non adopters of biogas technology were significantly different with respect to their innovativeness The non-adopters were also found with significantly lesser risk orientation and economic motivation than the sericulturists

While considering the acceptability or non-acceptability of an innovation it is recognised that the clientele's perceptions regarding the advantages form an essential aspect of adoption behaviour (Rogers 1962) Such evaluative perceptions are mostly subjective and constitute a major factor in the adoption decision In the case of prospective sericulturists also their perceptions about sericulture would have played an important role in the decision making process

4.6 2 Reasons for non-adoption

The results of the investigation made to identify the probable reasons for non-adoption as perceived by the prospective sericulturists are presented in Table 19

It was found that low price of cocoon which made the enterprise non-profitable was the most important reason for non-adoption The farmers who were interested in sericulture were motivated mainly by the profitability of sericulture As

Table 19 Reasons for non-adoption of sericulture technology as felt by prospective sericulturists

n - 60*

No	Reason	Frequency	Rank
1	Low price of cocoon making the enterprise non profitable	54	I
2	Lack of sufficient marketing & infrastructural facility	48	II
3	Lack of capital for the construction of rearing shed	43	III
4	Lack of credit facility	37	IV
5	Lack of sufficient human capital to look after the silkworms	30	V
6	Lack of irrigation facility	27	VI
7	Lack of incentives	22	VII
8	Discontinuance by neighbouring farmers	13	VIII

* Multiple response allowed

stated earlier favourable price for farm produce is an important incentive for adoption (Brown 1966) The greatest stimulus for adoption of a technology is the existence of a guaranteed market offering remunerative price The prospective sericulturists perceived the price of cocoon as unfavourable with regard to the production costs This perception was strengthened by the price fall of cocoon during 1992 93 This made the prospective sericulturists to withdraw from the adoption decision

The other important reasons identified were lack of adequate infrastructural and marketing facility lack of capital for construction of rearing shed lack of credit facility lack of sufficient human capital to look after the silkworms lack of irrigation facility lack of attractive incentives and discontinuance by neighbouring farmers

Production supplies and suitable marketing facilities must be available if farmers in substantial number are to adopt new technologies Being a non-traditional area for sericulture the State has the inherent bottlenecks in infrastructural facilities and marketing facilities The inputs like rearing equipment, disinfection chemicals planting materials, dfls required information etc are not readily available The marketing facilities available in the state are not at all sufficient These made the prospective

farmers decide to wait for the necessary developments in the field before stepping into the enterprise

Lack of capital for the construction of rearing shed and lack of credit facility were also important constraints of the prospective sericulturists. While analysing the cost of cultivation of sericulture it was estimated by Benchamin (1993) that the cost incurred for construction of rearing house was Rs 25 000 while Rs 11 250 had to be incurred for purchasing the rearing equipment by a farmer owning one acre of mulberry under rainfed condition. The respective figures under irrigated condition were Rs 42 000 and Rs 21 380. An average farmer found this initial investment too high to be met by own capital resources and hence it was a major problem. It was expected that credit institutions can help the prospective sericulturists to meet the credit requirements. But credit flow has not been satisfactory in sericulture due to lack of confidence on the part of lending agencies and the beneficiaries arising out of ignorance about the scope of the new enterprise (Benchamin 1993). This necessitates proper awareness on the part of lending agencies and beneficiaries for mobilisation of institutional credit in the sericulture sector.

Possibility for self employment or family engagement was an important attraction of sericulture. But when came to

reality the farmers recognised that eventhough the works in sericulture do not require any hard labour, it requires continuous and constant involvement of the workers In some cases when the person who got training leave the home for some other occupation, it becomes all the more difficult for the family to continue with the project Hence lack of human capital was also perceived as an important reason for non adoption

Mulberry requires irrigation for its proper growth and the non adopters perceive lack of irrigation facility as a reason for non-adoption of sericulture This points to the fact that proper rainfed technologies must be evolved in mulberry cultivation as well as credits must be made available for the development of irrigation facility

According to the extrinsic motivation theory an activity is accelerated when an incentive or goal is artificially introduced into the situation Incentives in the form of subsidies supply of equipment planting materials etc are greatly helpful in extension work as motivators But the prospective sericulturists were of the opinion that the incentives were not attractive in sericulture This might be due to lack of adequate information about the incentives or lack of attraction of the incentives already declared

The year 1993-94 had witnessed the temporary recession or complete discontinuance of some of the sericulturists due to the price fall of cocoon to a nonprofitable level. This discontinuance or rejection by neighbouring farmers became one of the reasons for non-adoption as the prospective sericulturists lost their confidence.

4.7 Empirical model of the study

The results on adoption behaviour of sericulturists are represented diagrammatically in the empirical model presented in Fig 7.

The adoption behaviour of sericulturists consists of two major components viz. extent of adoption and knowledge level. These are depicted by the inner circle which is divided into two equal halves. The adoption behaviour is influenced by external and internal factors such as socio-economic and personal characteristics of the sericulturists, motivational factors and constraints in adoption. These factors are represented by the outer circle which consists of four sectors.

The behavioural characteristics significant in predicting the adoption of sericultural practices are education level, family size, land holding, family labour participation, innovativeness, leisure time availability,

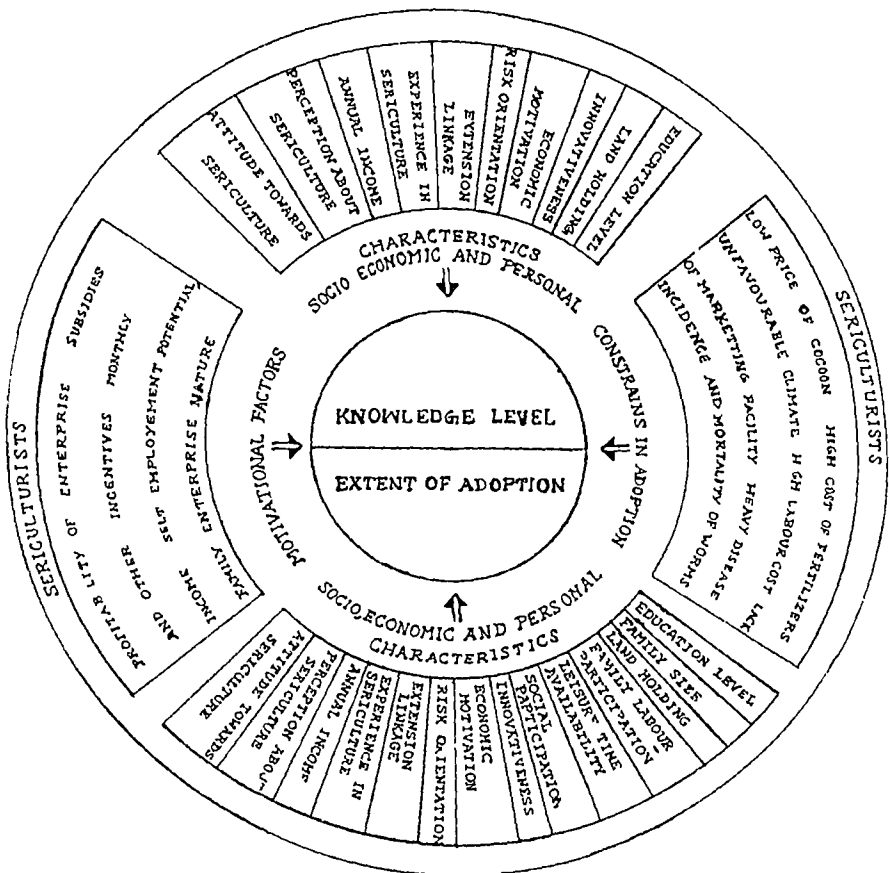


Fig 7 Empirical diagram based on the findings of the study

social participation economic motivation risk orientation, extension linkage, experience in sericulture perception about sericulture annual income and attitude towards sericulture while those of knowledge level are education level land holding innovativeness, economic motivation risk orientation extension linkage experience in sericulture, annual income perception about sericulture and attitude towards sericulture

The important motivational factors are profitability of the enterprise subsidies and other incentives monthly income potential for self-employment and family enterprise nature The important constraints are low price of cocoon high cost of fertilizers unfavourable climate high labour cost lack of marketing facility and heavy disease incidence and mortality of worms

The outermost circle represents the sericulturists who formed the respondents of the study whose adoption behaviour and related factors and issues are depicted in the given model

Summary

CHAPTER V

SUMMARY

Sericulture, with its agriculture base industrial superstructure and labour intensive nature, had become one of the important rural industry. In Kerala, sericulture has been popularised by the Khadi and Village Industries Board as an income and employment generating enterprise. Since the introduction of this enterprise in 1986 and launching of the Sericulture Development Project in 1990-91, the farmers of Kerala were found increasingly attracted towards mulberry cultivation and silkworm rearing. The success of the dissemination of this new enterprise depends on the successful performance of the early adopters. As the production and productivity in sericulture depends upon the extent of adoption of recommended practices by farmers, an analysis of the adoption behaviour of sericulturists will be helpful for planning effective extension strategies in future.

The present study was therefore undertaken with the specific objective to study the knowledge level and extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by the sericulturists. Other objectives being to find out the relationship of selected socio, economic and personal variables of the sericulturists with

their knowledge level and extend of adoption, to identify the motivational factors and constraints in adoption as well as reasons for non-adoption by prospective sericulturists

The study was conducted in Palakkad and Thrissur districts of Kerala during 1993-94. Eighty sericulturists from Palakkad and 40 from Thrissur were randomly selected to form a total sample of 120 respondents for the study. From the same areas, 60 prospective sericulturists were also randomly selected to form another category of prospective sericulturists. The data regarding the selected dependent and independent variables were collected using a structured interview schedule prepared for the purpose. The data were analysed with the help of suitable statistical tools.

The salient findings of the study were summarised and presented below.

It was found that the average adoption quotient of the sericulturists was 66.19. Majority (70.00%) of the respondents belonged to the medium adoption category and 16.67 per cent belonged to high adoption category.

Cent per cent of the respondents had adopted the recommended variety of mulberry and method of leaf harvest. Majority of the farmers had adopted recommended spacing, cultural operations, recommended pruning techniques and

irrigation In the case of FYM application and fertilizers majority resorted to partial adoption None of the farmers had adopted any plant protection measures

All/majority of the sericulturists had adopted the practices like type of dfl , incubation and uniform hatching , bed cleaning using net spacing of worms leaf feeding and mounting density and harvest in the recommended way The adoption level of care at moulting storage of leaf temperature and RH control sterilisation of rearing rooms and appliances bed disinfection and disease control were low Most of the farmers had only low rearing house and equipment facility, and were rearing only lesser number of dfls

It was found that the average knowledge gap existing among the sericulturists was 22.96 (38.26%) and the majority of the respondents (56.67%) had a knowledge gap above the average level

Considerable knowledge gap existed in practices like FYM application pruning, fertilizer application and plant protection of mulberry garden In silkworm rearing the knowledge gap was found in practices like number of dfls rearing house equipment moulting care, sterilisation of rearing rooms and appliances bed disinfection and disease

control Except the aforesaid practices majority of the respondents were aware of other sericultural practices.

Correlation coefficient analysis revealed that education level family size land holding leisure time availability social participation innovativeness economic motivation risk orientation extension linkage, experience in sericulture annual income perception about sericulture, attitude towards sericulture and knowledge about recommended practices had significant positive relationship with extent of adoption Family labour participation had significant negative relation with extent of adoption

Using step-down regression analysis it was found that leisure time availability innovativeness risk orientation annual income and knowledge about recommended practices were the best set of variables for predicting the extent of adoption These variables were responsible for 58.58 per cent variation in extent of adoption

Path coefficient analysis showed that knowledge about recommended practices (x_{19}) had the maximum direct effect on extent of adoption It was also found that the effects of most of other variables were routed through the variables like knowledge, innovativeness annual income and risk orientation

Education level, land holding innovativeness, economic motivation risk orientation, extension linkage, experience in sericulture, annual income, perception about sericulture and attitude towards sericulture had positive significant relation with knowledge of sericulturists

Education level innovativeness risk orientation extension linkage and attitude towards sericulture were the best set of variables in predicting the knowledge of sericulturists about recommended practices as revealed by step-down regression analysis

Extension linkage had the maximum direct effect on knowledge The effects of other variables were mostly routed through variables such as extension linkage annual income, risk orientation and attitude towards sericulture

Profitability of the enterprise was found to be the most important motivational factor in adoption of sericulture Subsidies and other incentives monthly distributed income generation potential for self employment feasibility as a family enterprise possibility of getting loan etc were the other important factors which motivated the farmers to take up sericulture

It was found that most of the farmers were motivated to start sericulture by seeing other farmers who had already

started sericulture Mass media sources and field extension workers of KVIB were also prominent as the motivational agents

Low price for cocoon high cost of fertilizers unfavourable climatic conditions high labour cost lack of marketing facilities and heavy disease incidence and mortality of worms were the important constraints as perceived by the sericulturists

There was significant difference between sericulturists and prospective sericulturists with regard to the socio economic and personal characteristics such as education level occupation family size leisure time availability social participation innovativeness economic motivation risk orientation extension linkage perception about sericulture and attitude towards sericulture

It was identified that the low price of cocoons leading to the nonprofitability of this enterprise was the most important reason pointed out by the prospective sericulturists as the reason for their non-adoption Lack of adequate infrastructural and marketing facilities lack of capital to construct rearing shed lack of credit facility lack of sufficient human capital to look after the worms were other important reasons of non-adoption

Implications of the study

The overall view on the results of the present study implies to the following facts

Sericulture with its family enterprise nature and income generating ability is found suitable to the rural farm families in Kerala

There was wide variation in the adoption of some of the crucial practices like plant protection in mulberry gardens and disinfection environmental regulation and disease control in silkworm rearing. Majority of the farmers had a knowledge level less than the average level. This indicates the need for strengthening the extension system. There is need for conducting suitable promotion activities like trainings demonstrations field visits etc. So that the knowledge gap is reduced to the minimum level. The field level extension workers also should be made more competent in various practical aspects like disinfection disease control etc. so that they can provide need-based recommendations to the sericulturists. Care must also be taken to develop necessary entrepreneurship among the farmers so that they can utilise their resources to the optimum potential. Knowledge extension linkage capital time risk orientation and innovativeness were the important factors influencing the

adoption of sericulture This points to the need for developing an extension strategy which focusses on imparting knowledge inculcating necessary dispositions supporting with capital and infrastructural facilities and helping in resource management

There is immediate need for ensuring a favourable price for cocoons and starting a cocoon market within the state Starting reeling centres within the state will help cocoon producers to get rewarding prices as well as it will create additional employment opportunities for rural people It was also found that the enthusiasm of farmers were decreasing as a result of the economic constraints

The motivating effects of the profitability self-employment potential family enterprise nature monthly income generation etc of sericulture are to be well-highlighted by the extension agencies among the potential adopters of the technology The over emphasis on subsidies and incentives as a motivating factor may lead to a situation where the farmers are not initially analysing the rationality of the innovation Because of this hasty adoption with any subsequent difficulties in the field most of them are rejecting the technology The perceived importance of the successful fellow farmers as a motivating agent also should be considered while planning the extension activities Field visits to such farms

and discussion with them may also help in motivating the non-adopters

Non profitability of the enterprise was the most important reason for non-adoption This shows the need for disseminating a more realistic picture about the cost benefit analysis of sericulture And also sufficient infrastructural credit and marketing facilities must be made available to the farmers if the enterprise is to be popularised

Suggestions for future research

- 1 The feasibility of the recommended practices in sericulture as per the recommendations of Central Silk Board has to be checked and revised in accordance to the agro climatic conditions of Kerala For this location based researches should be carried out and problem based recommendations should be given
- 2 Economic analysis of the sericulture enterprise covering the cost of cultivation, cost-benefit analysis productivity analysis market analysis etc should be conducted so as to get a more realistic picture
- 3 A survey and indepth study of the quality of cocoons produced in the state has to be conducted and improved recommendations may be brought out so that farmers can be made more quality conscious

- 4 In the present study the constraints of the farmers are analysed on a general basis. A more exhaustive analysis of the constraints in the adoption of each recommended practices will be helpful to suggest remedial measures.
- 5 As the present study was limited to two districts only, a more exhaustive research covering all regions will be helpful to draw more generalising conclusions.
- 6 An evaluation of the training programmes conducted by the KVIB for the farmers will be helpful to find out the limitations of the programme.

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Appendices

APPENDIX-I

College of Horticulture
Kerala Agricultural University
Vellanikkara

From

Dr P S Geethakutty
Asst Professor
Dept of Agricultural Extension

To

Dear Sir

This is in connection with a research study undertaken by Miss Susamma P V who is doing her M Sc (Ag) programme under my guidance She is doing her thesis work on adoption behaviour of sericulturists

Considering your rich experience you have been chosen as an expert for judging the relevancy of the independent variables related to the study Please go through the enclosed list of variables which are supposed to be related to adoption behaviour of sericulturists You may please indicate your opinion about the inclusion of each variable in the study by marking (/) against each variable in the appropriate column You can also add other variables which you think are related and also rate them under the appropriate column

Inspite of your busy schedule I hope that you will kindly spare some time for us Your kind and early action in the matter would greatly help us to complete the study in time Please return the duly filled annexure to the address indicated in the envelope at the earliest

Thanking you

Yours faithfully

P S Geethakutty

List of variables selected for relevancy rating with their mean relevancy score

Variables	Mean relevancy score
Age	2 55
* Education level	3 48
Family education level	2 64
Type of family	2 36
* No of family members	3 06
Marital status	1 82
* Occupation	3 27
* Land holding	3 33
* Area under mulberry cultivation	3 73
Annual income	3 35
* Credit utilisation	3 20
Credit availability	3 00
Cosmopolitaness	2 88
* Social participation	3 10
* Extension linkage	3 81
Conservatism	2 30
* Risk orientation	3 40
* Attitude towards sericulture	3 73
Management orientation	2 92
* Innovativeness	3 60

Variables	Mean relevancy score
* Perception about sericulture	3 50
* Economic motivation	3 70
Achievement motivation	3 00
Scientific orientation	2 98
Competitiveness	2 97
Self reliance	3 00
Irrigation facility	2 79
* Family labour participation	3 63
* Experience in sericulture	3 33
Infrastructural facility	3 02
* Labour availability	3 43
* Leisure time availability	3 13
* Knowledge about recommended practices	3 70
* Variables selected	\bar{x} 3 05

APPENDIX-II

Statements selected for developing the scale for measuring the attitude of farmers towards sericulture with their t value

	Statements	t value
1	Sericulture is a profitable enterprise (+)	2 56
2	I think it was my foolishness to start sericulture ()	3 31
3	Sericulture is a highly risky enterprise ()	2 56
4	Sericulture is the best way to convert the family labour into monetary profits (+)	2 19
5	It there is favourable circumstances I will continue this enterprise as a stable occupation of my family (+)	3 24
6	On a long term basis the demand for silk and thereby the scope of sericulture will definitely improve (+)	3 14
* 7	When we consider the difficulties in getting good quality DFLs and other inputs it is better not to do sericulture (-)	3 64
8	Sericulture is a very good self employment venture for housewives (+)	1 55
9	Sericulture cannot be a lose because it works mostly on family labour (+)	3 31
*10	Sericulture helps the family members to engage themselves in some money earning activities (+)	3 88
*11	Sericulture is suitable even for small farmers (+)	4 80

	Statements	t value
*12	One cannot take up silkworm rearing successfully due to disease incidences (-)	7 12
13	Compared to other crops sericulture pays better (+)	2 83
*14	The present fall in cocoon prices will definitely improve in the future (+)	7 39
15	Sericulture enterprise is feasible for rich farmers only (-)	1 99
*16	Agencies who promote sericulture claim economic profitability for this enterprise but it is not true (-)	8 85
*17	I will persuade my neighbours to start sericulture (+)	4 33
18	The price of cocoons is not at all justifiable for the manual labour engaged in it ()	3 59
19	I have started this silkworm rearing mainly due to the possibility of getting a loan (-)	2 79
*20	I am planning to stop this business and shift to some other crops (-)	5 39

* Statements included in final scale

APPENDIX III

ADOPTION BEHAVIOUR OF SERICULTURISTS - A MULTIVARIATE ANALYSIS

Interview schedule

Respondent No

Name of the farmer

Address

District

PART - A

SOCIO, ECONOMIC AND PERSONAL CHARACTERISTICS

- | | | |
|---|--|--|
| 1 | Education level | Functionally literate/Primary/
UP/HS/PDC/Degree/Post Graduate |
| 2 | No of family members | |
| 3 | Occupation | Major
Sub |
| 4 | Total land holding | Dry land
Wet land
Total |
| 5 | Area under mulberry
cultivation | |
| 6 | Credit utilisation | |
| | Have you availed any loan
for sericulture | Yes / No
(2) (0) |
| | If yes | |
| | Have you taken the full
amount as per the
proposal of KVIB | Yes / No
(2) (0) |

Have you utilised the loan for sericulture itself Yes / partially / No
 (2) (1) (0)

Have you repaid/are you repaying the loan without defaults Yes / Occasionally / No
 (2) (1) (0)

7 Family labour participation

Operations	Full	Partial	Nil
------------	------	---------	-----

Mulberry cultivation

Irrigation

Fertilizer and manure application

Leaf harvesting for young age larvae

Leaf harvesting for old age larvae

Pruning

Silk worm rearing

Young ages

Late ages

Mounting

Harvesting and bagging

8 Leisure time availability of family members (Hours/day)

Adults	Male
	Female
Children	
Total	

9 Social participation

Organisations	Nature of membership		Frequency of participation		
	Member	Office bearer	Always	Some- times	Never
Sericultural Co-operative Society					
Voluntary sericulture extension organisation					
Sericultural farmers organisations					
Service Co operative Societies					
Karshaka Samithi					
Farmers Organisations (Political)					
Youth Clubs					
Arts and Sports Club					
Any other					

10 Labour availability

Whether hired labour is available for various operations

	Easily avail- able	Avail- able	Diffi- cult	Not avail- able
Mulberry cultivation				
Silk worm rearing				
During peak agricultural season				

11 Innovativeness

S1 No	Items	Most like	Least like	Most like/ least like
1 a	I try to keep myself up to-date with information on new farm practices but does not mean that I try out all the new methods in my farm (2)			
b	I feel restless till I try out a new farm practice I have heard about (3)			
c	They talk of many new farm practices these days but who knows if they are better than old ones (1)			
2 a	From time to time I have heard of several new farm practices and I have tried out most of them in the last few years (3)			
b	I usually wait to see the results my neighbours obtain before I try out the new farm practices (2)			
c	Somehow I believe that the traditional way of farming is the best (1)			
3 a	I am cautious about trying a new practice (2)			
b	After all our forefathers were wise in their farming practices and I do not see any reason for changing their old methods (1)			
c	Often new farm practices are not successful however if they are promising I would surely like to adopt them (3)			

12 Economic motivation

	SA	A	UD	DA	SDA
1 A farmer should work towards higher yield and economic profits (+)					
2 The most successful farmer is one who makes the maximum profit (+)					
3 A farmer should try any new farming ideas which may earn him money (+)					
4 A farmer should grow cash crops to increase monetary profits in comparison to growing food crops for home consumption (+)					
5 It is difficult for the farmers children to make good start unless he provides them with economic assistance (+)					
6 A farmer must earn his living but the most important thing in life cannot be defined in economic terms ()					

13 Risk orientation

	SA	A	UD	DA	SDA
1 A farmer should grow large number of crops to avoid greater risks involved in growing one or two crops (+)					
2 A farmer should take more of chance in making a big profit than to be content with a smaller but less risky profit (+)					

- 3 A farmer who is willing to take greater risk than the average farmer usually does better financially (+)
- 4 It is good for a farmer to take risk when he know his chances of success is fairly high (+)
- 5 It is better for a farmer not to try new farming method unless most others in the locality have used it with success (-)
- 6 Trying entirely new method in farming by a farmer involves risk but is worthy (+)

14 Extension linkage

Scientists of University
Dt Sericultural Officer
Sericulture Field Asst
Agricultural Officer
Agricultural Assistant
Sericulture Extension Worker of NGO
Other sericulture farmers
Other farmers/relatives
TV
Radio
Newspaper
Sericultural journal/publications
Other farm journals

Awareness

How often you purposefully contact	Most often
	Often
	Sometimes
	Rarely
	Never

How often
you receive
on-farm
guidance

Most often
Often
Sometimes
Rarely
Never

Participation in

One month
training (4)
(2)

Seminar (1)
(0)

Meetings (2)
(1)
(0)

Exhibitions
(2)
(1)
(0)

15 Experience in sericulture expressed
as number of rearings taken so far

16 Annual income

Income from agriculture
Income from other sources
Total

17 Perception about sericulture

Practicability

- 1 The adoption of sericulture practice involves
 - a the learning of no new knowledge and skill
 - b some easily learnable skills
 - c not certain
 - d learning few difficult skills
 - e learning many difficult skills
- 2 The produce of sericulture i e cocoons are
 - a most easily marketable
 - b marketable

- c uncertain about the market
 - d marketable with some difficulty
 - e marketable with utmost difficulty
- 3 The necessary inputs (DFL PPC Fertilizer equipment) can be
- a obtained most easily
 - b obtained without much difficulty
 - c do not know about the availability
 - d obtained with some difficulty
 - e cannot be obtained at all
- 4 I could mobilise the necessary resources to meet the requirements for starting and running the sericulture
- a most easily
 - b easily
 - c not sure
 - d with some difficulty
 - e it is very difficult

Productivity

- 5 Adopting sericulture practise would result in
- a immediate and high improvement in income
 - b improvement in income with reasonable period of time
 - c not sure about the improvement in income
 - d may improve the income in future
 - e will not improve the income
- 6 The adoption of sericulture could
- a make use most effectively the existing land family labour leisure time and other resources
 - b make use some of the existing resources
 - c not sure whether the existing resources can be made use
 - d make inefficient use of some of the existing resources
 - e not possible with the existing resources
- 7 The adoption of sericulture
- a definitely involves no risk at all
 - b seems to involve no risk
 - c uncertain about the risk
 - d involves some risk
 - e involves high degree of risk

- 8 The economic return from sericulture is
- a the highest of all the other crops that I have grown
 - b higher than some of the other crops
 - c as same as other crops
 - d lower than many of the crops
 - e lowest of all the other crops that I have grown

Motivity

- 9 The adoption of sericulture would
- a definitely improve the social status
 - b perhaps many gain some name among my fellow farmers
 - c do not know
 - d no influence on the status
 - e decrease my social status
- 10 The income from sericulture will
- a definitely result in improvement of the living standard of the family
 - b may help to improve the living standard
 - c not sure
 - d perhaps not result in improvement of living standard
 - e definitely no improvement in living standard
- 11 At present the incentives available for a farmer who starts sericulture is
- a very attractive and sufficient
 - b enough to meet some necessities
 - c not aware about the incentives
 - d not attractive and insufficient
 - e not at all getting any incentive
- 12 The guidance and help in the adoption of sericulture is
- a most easily available at any time
 - b available at times of requirement
 - c not aware about the possibilities
 - d difficult to get sufficient guidance
 - e most difficult to get any guidance

18 Attitude towards sericulture

Statements	SA	A	UD	DA	SDA
1 When we consider the difficulties in getting good quality DFLs and other inputs it is better not to do sericulture (-)					
2 Sericulture helps the family members to engage themselves in some money earning activities (+)					
3 Sericulture is suitable even for small farmers (+)					
4 One cannot take up silkworm rearing successfully due to disease incidences (-)					
5 The present fall in cocoon prices will definitely improve in the future (+)					
6 Agencies who promote sericulture claim economic profitability for this enterprise but it is not true (-)					
7 I will persuade my neighbours to start sericulture (+)					
8 I am planning to stop this business and shift to something else (-)					

PART - B

ADOPTION SCALE

Mulberry cultivation

1 Variety of mulberry grown Kanva 2/MS/5-54/Local

2	Spacing followed	ft x	ft
3	Quantity of FYM applied		ton/acre
4	Quantity of fertilizer applied	Type	Quantity(kg)/acre
		1	
		2	
		3	
	No of splits given	1 / 2 / 3 / 4 5	(1) (2) (3) (4)
5	Whether timely weeding done	Yes / No	
6	Time of bottom pruning		
	Height of bottom pruning		
	Whether middle pruning done	Yes / No	
	Whether top clipping done after each harvest	Yes / No	
7	Area of mulberry under irrigation	Full / >50% / <50%	
		(3)	(2) (1)
	Frequency of irrigation	8 10 / 15-20 / Once in a	
		days	days month
		(3)	(2) (1)
	Periodicity of irrigation	2 / 3-4 / 5 6 months	
		months	months
		(1)	(2) (3)
8	Do you practice any prophylactic control measures against pest diseases	Yes / No	
	Control measures adopted		
	Diseases noticed	Control adopted	
	1	-----	
	2		
	3		
9	Method of leaf harvest	Leaf / twig	

Silkworm rearing

- 1 Type of dfl reared Crossbred / Pure / Local line
- 2 No of dfls reared
per rearing
no of rearings
total dfl/year
- 3 Rearing house
- Type of rearing house Separate rearing shed (4)/
Attached to the living house(3)/
Inside living house (2)/
Attached without any walls (1)
- Roofing material Thatched/Tiled/Tiled/RCC
with
sealing
(4) (3) (2) (1)
- Floor area of rearing room ----- sq ft
- 4 Equipments
- No of trays possessed
No of chandrikas possessed
- 5 Incubation and uniform hatching
- a Are you keeping the eggs in Yes / No
temperature and humidity (1) (0)
controlled conditions for hatching
- Are you following black boxing to get Yes / No
uniform hatching of eggs (1) (0)
- 6 Spacing of worms
- Stage of worms

I II III IV V

- No of trays using at each
stage per 10 dfl

- 7 Feeding of worms
- | Stage of worms | | | | |
|----------------|----|-----|----|---|
| I | II | III | IV | V |
- a Age of leaf
b Size of leaf
c Frequency of feeding
- 8 Cleaning
- | | |
|--------------------------|------------------------------------|
| a Method of bed cleaning | Hand cleaning/Using net
(0) (1) |
|--------------------------|------------------------------------|
- | Stage of worms | | | | |
|----------------|----|-----|----|---|
| I | II | III | IV | V |
- b No of cleanings done
- 9 Storage of leaf
- | | |
|-----------------------------|--|
| Are you preserving the leaf | Storing in leaf box with wet gunny cover (3)/
Heaps on floor with wet gunny cover (2)/
Spread over the floor (1) |
|-----------------------------|--|
- 10 Care at moulting
- | | |
|--|----------|
| a Do you feed your worms at moulting stage | Yes / No |
| b Are you giving chopped leaves just after moulting | Yes / No |
| c Do you remove the wet pads and paraffin paper cover at time moulting | Yes / No |
| d Do you keep the room dry by opening the windows | Yes / No |
- 11 Temperature and RH control
- | | |
|---|--|
| a Are you following the regulations correctly | |
| - Always keeps the temperature and RH at the prescribed level (3) | |

- Occasionally notes the temperature and do necessary steps (2)

Do anything at extreme conditions only (1)

Do not follow any regulation (0)

b Are you using any method to regulate the temperature

Fans / Heater / Gunny mats / Sealing / Air cooler
(1) (1) (1) (1) (1)

12 Sterilisation of rearing rooms and appliances

a Are you doing sterilisation of rearing rooms

Regularly after each rearing / after two rearings/
(3) (2)
Sometimes (1)

b Are you using formalin

Yes / No
(1) (0)

dose of solution

2% / Not sure
(1) (0)

method of application

Spraying / washing
(1) (0)

c Are you using bleaching powder to disinfect the equipments

Yes / No
(1) (0)

dose

5% / Not sure
(1) (0)

Method of application

Washing / Spraying
(1) (0)

d Do you follow 24 hours closing of the rearing rooms air tight for fumigation

Yes / No

13 Bed disinfection

a Quantity of R K O powder used for rearing
100 dfl

kg

14 Disease control

Have you noticed any disease
for your worms

Yes / No

If yes

Diseases noticed

Control adopted

15 Mounting and harvesting

No of chandrika/Netrika used
for mounting one DFL

Harvesting of cocoon done
after

days

PART - C

KNOWLEDGE TEST

Items

1 A variety of mulberry
suited for cultivation in Kerala

2 What is the recommend spacing

3 How much quantity of FYM has to
be applied per acre per year

2 / 4 / 6 / 8
ton ton ton ton

4 What is the recommended
fertiliser dose

N
P
K

No of splits to be applied

2 / 3 / 5

5 No of weedings and
intercultivation to be done

- 6 Height of pruning recommended
 When has to do bottom pruning
 When has to do middle pruning
- Is there any need for top clipping after each harvest Yes / No
- 7 The frequency of irrigation recommended 8-15 days / 3-5 days / 15 20 days
- 8 Name a disease affecting mulberry plants
 What is its control measure
- 9 The method of leaf harvest Leaf / twig
- Silkworm rearing
- 10 Name a type of silkworm suited to Kerala
- 11 No of dfls that can be reared per rearing from one acre irrigated mulberry
 No of times of rearing per year
 Total no of dfls that can be reared per year 200/400/600/800/1000
- 12 Most suited rearing shed Separate/attached/inside living room
 Most suited roof Thatched / Tiled / RCC
 The floor area recommended ---- Sq ft
- 13 No of trays needed for rearing worms in one acre mulberry garden
 No of chandrikas needed
- 14 Sterilisation of rearing rooms has to be done Regularly after each rearing / alternately/ sometimes/ not needed

Chemical used for disinfecting
the rooms

Dosage
Method of application

Chemical used for disinfecting
the appliances

Dosage
Method

- Whether the rooms has to be
closed air tight for 24 hours Yes / No
- 15 Method for attaining uniform
 hatching
- How the temperature can be
 controlled at the time of
 incubation
- 16 No of trays needed for 10 DFL
 at the last instar 4 5 / 6-7 / 8-10
- 17 Quantity of leaf to be fed
 in the last instar for 10 DFL
- Whether the leaves are to be
 chopped for feeding young worms Yes / No
- No of feedings per day As much as possible/
 4 times / 2 times
- The young worms are to be fed
 with Young leaves/
 mature leaves
- Whether leaves are to be toweled
 during rainy season
- 18 Which is the best method of
 cleaning the trays hand/net
- How many cleanings has to be
 given in first instar
- 19 The leaves have to be stored

- 20 Whether the worms be fed during moulting Yes / No
- The trays have to be kept Wet / Dried at moulting
- The rooms have to be kept
- The worms can be fed with full leaves just after moulting True/False

- 21 What is the recommended temperature and RH at
- First instar
- Last instar
- A method to control temperature

- 22 The quantity of RKO powder required for 100 DFL
- The RKO has to be applied After each moult/
Not specific

- 23 No of chandrikas needed for 10 DFL
- The cocoons can be harvested after days

- 24 Name the diseases of silkworms

Diseases	Control
-----	-----
1	1
2	2

Is there any insect pest for silkworm

PART D

Factors which motivated the farmers to start sericulture

A Which are the factors that motivated you to start sericulture (in the rank order of importance) among the following list

Factors	Rank
1 Profitability of the enterprise	
2 Potential for self-employment	
3 Improvement in social status	
4 Monthly distributed income generation	
5 Can do as a hobby	
6 Novelty of the enterprise	
7 Manageability by farm women	
8 Possibility of getting loan	
9 Subsidies and other incentives	
10 Feasibility to adopt by small farmers	
11 Potentiality as a family enterprise	

B Which are the motivational agents (choose the agent which motivated you)

Number of agents	1st	2nd
1 Family members		
2 Agents of voluntary organisations		
3 Extension workers of KVIB		
4 Extension workers of NSP		
5 Neighbouring farmers who had started sericulture		
6 Mass media		
7 Friends		

ABSTRACT

A study was undertaken to estimate the knowledge level and extent of adoption of recommended practices in mulberry cultivation and silkworm rearing by the sericulturists. It also aimed to identify the factors which motivated them to start this new enterprise and their constraints in adoption as well as reasons for non-adoption by prospective sericulturists. The study was conducted during 1983-84 among the sericulturists in Palakkad and Thrissur districts of Kerala. The respondents for the study included both sericulturists (n=120) and prospective sericulturists (n=60). The data were collected by interview method using a pre-tested structured interview schedule.

It was found that majority (70%) of the respondents belonged to the medium adoption category. In the case of mulberry cultivation the adoption levels for FYM and fertilizer application and plant protection were low; while in silkworm rearing, the practices like care at molting, storage of leaf, temperature and relative humidity control, sterilisation of rearing rooms and appliances, bed disinfection and disease control were adopted only partially. Most of the farmers had only lesser rearing house and equipment facilities and reared lesser number of dfls.