CONSTRAINTS TO DIFFUSION OF SERICULTURE TECHNOLOGY IN KERALA

A CASE STUDY OF PALAKKAD DISTRICT

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*I hereby affirm that the research for this dissertation titled "**Constraints to Diffusion of Sericulture Technology in Kerala– A Case Study of Palakkad District**" being submitted to the Jawaharlal Nehru University for the award of the Degree of Master of Philosophy in Applied Economics was carried out entirely by me at the Centre for Development Studies, Thiruvananthapuram.*

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Certified that this dissertation is the bonafide work of Smt Shaheena P. and has not been considered for the award of any other degree by any other University.

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CHAPTER I

INTRODUCTION

Kerala is a late entrant into the world of sericulture. But its introduction into the state has roused great expectations and bold plans have been drawn up for its propagation. It is too early for a full scale assessment of the strategy adopted. However it is important to evaluate the contemporary experience systematically and draw up conclusions. This is what we are attempting, within the limitations imposed by time and resources, in the present study, ***Constraints to Diffusion of Sericulture Technology - A Case Study of Palakkad District.***

Silk-production, which is a highly employment-oriented and low capital intensive activity is suited to the conditions of a labour-abundant, agro-based economy. The impact of sericulture on development stems from its favourable economic, distributional, and environmental impacts (Sanjay Sinha 1989). It contributes to the improvement in the standard of living of the people by increasing the employment opportunities and income of the small and landless labour households without unduly straining land and other resources. As silkworm production activities are virtually all in the informal sector it can safely be assumed that a significant portion of the employment created will be available to landless and marginal farming families, which hire out their labour to sericulture families[1] (Hanumappa, 1985)

Even though the claims of Sanjay Sinha (1989) that sericulture contributes to reduction in inter-household disparity has yet to be tested empirically, the suggestion that sericulture has a favourable influence on the intra-household balance of power is a likely outcome. Sericulture is supposed to be predominantly female occupation and results in the improvement in the work participation and earnings of the women[2]. However it must be remembered that work participation and improvement in income are only a necessary and not a sufficient condition of empowerment of women[3].

Finally the input requirements of fertilizer and pesticides are relatively low as mulberry is a hardy crop. It is also considered an environmentally friendly crop that does not generate undue strain of the natural resource endowments.

SECTION I

Progress of Sericulture in India:

China is generally believed to be the original home of mulberry silk[4]. However, during the first half of the present century it was Japan that dominated the global silk economy accounting for as much as nearly 80 percent of world production during the 1930s.(see Table 1.1). Japanese share in the world production began to dramatically decrease in the post World War period. From 56 percent in 1966 it declined to 16 percent in 1985 and further to 7 percent in 1990. Japan's decline has

proved to be a gain for China, whose output as well as share in world production has dramatically increased to 42 percent in 1980. Chinese output has continued to rise through the 1980s. But it is evident that production has tended reach a plateau during the latter half of the 1980s. The output of South Korea another major Asian producer has also tended to decline in the 1980s. In 1980s output the rate of growth of production in Japan, erstwhile U.S.S.R, South Korea, and others registered a negative growth rate of -10.69, -0.38, -9.90 and -3.8 respectively. China whose output which had increased by 22.04 percentage per annum during 1970s has decelerated to 4.53 during the latter half of the 1980s.

Rapid industrialization and emergence of labour shortage in Japan were the main reasons for the decadence of sericulture in that country. Decline of Korean Industry also took place during the phase of rapid industrialization. The void created by the reduction in the output of these countries has enabled countries like India to effect a major expansion of their sericulture industries. India's output which was a mere 1.27 percent during 1938 had slowly inched forward to 5 percent by 1975. But since then it had rapidly increased to around 16 percent in 1990. Though the Indian production is next to China in the world the former is still a poor second ranker.

There was a virtual collapse in world silk industry during the post World War period. The global production slowly climbed back to the prewar level only by mid seventies. The next one decade proved to be one of relative stagnation. But the

production and consumption of silk seems to have accelerated in the latter half of the eighties.

In the developed countries use of silk is no longer confined a to handful of noble rich as it used to be earlier. A world wide 'silk craze' is reported to be catching on in the past few years(Central Silk Board (CSB) 1992). The demand from middle income earners are on the increase. Newly developed fabrics for suits and garments have also tended to increase the demand. Imports of silk fabrics to U.S.A have increased twenty five fold between 1980 and 1989. Domestic consumption also increased in the silk producing countries including Japan, Korea, India, and Brazil. According to the U.N experts the world raw silk output will grow up to 85,000 tonnes by 1995 - a 27 percent increase of the current world output (CSB 1992). The decrease in the overall production of silk cocoons in some of the major silk producing countries and increase in demand for raw silk provides opportunity for developing countries to expand production (Jolly M.S 1979). Over 25 countries in Asia, Africa and South Africa are at present envisaging or are actually engaged in sericultural projects of various dimensions. The levelling off of production by China , decline in the growth rate of other countries , promises new avenues for countries like India.

Table 1.1

Share of The Major Silk Producing Countries In The World Production of Raw Silk

(1000 tonnes)

Name of The Country	Year						
	1938	1966	1970	1975	1980	1985	1990
China	4.85 (8.43)	7.18 (21.89)	14.50 (32.82)	22.10 (39.86)	23.49 (42.32)	32.00 (54.51)	46.40 (63.67)
India	0.69 (1.20)	1.50 (4.57)	2.25 (5.09)	2.40 (4.33)	4.60 (8.28)	7.03 (11.97)	11.49 (15.76)
Japan	43.10 (74.92)	18.60 (56.71)	20.50 (46.40)	19.00 (34.27)	16.16 (29.11)	9.59 (16.34)	5.72 (7.85)
USSR (former)	1.90 (3.30)	2.64 (8.05)	3.00 (6.79)	3.30 (5.95)	4.25 (7.66)	4.00 (6.81)	4.09 (5.62)
S.Korea	1.82 (3.16)	1.15 (3.51)	2.84 (6.43)	5.02 (9.05)	3.28 (5.91)	1.85 (3.15)	1.20 (1.65)
Others	5.17 (8.99)	1.73 (5.27)	1.09 (2.47)	3.62 (6.53)	3.73 (6.72)	4.23 (7.20)	3.98 (5.46)
Global output	57.53	32.80	44.18	55.44	55.50	58.70	72.88

Note: Figures in parenthesis are percentages to Global output

Source: Silk in India: Statistical Biennial 1992, F.A.O Agricultural Services Bulletin, China: Sericulture and F.A.O Sericultural Development In Asia.

Apart from the above favourable international environment, the strategical emphasis laid by the various Five Year Plans played a major role in the recent expansion of sericulture in India. It was only from Third Five Year Plan onwards that any special consideration in the plan programmes was assigned to sericulture . Efforts were concentrate in the traditional states. Special efforts at diffusing the technology in the non-traditional areas by way of supplying mulberry cuttings/

saplings at subsidised rates was initiated during the Fifth Five Year Plan. Emphasis on seed organization , research and development, and stabilise domestic markets canalising imports of raw silk and its distribution in order to stabilise the domestic markets and modernisation of spinning and reeling were the salient features of the Government policies during the five year plans. But the major problem with countries like India is that the quality of yarn does not confirm to the International standards. Therefore, a new strategy had been envisaged by the Government of India with the assistance of World Bank and Swiss Development Corporation for the diffusion of sericulture technology in the seventeen states of the country, to develop a high quality bivoltine silk which confirms to the international standards.

Some of the major indicators of sericultural growth in India are given in Table 1.2. Compound Growth rate for each indicators had been calculated using the semi log function on time. There has been a three fold increase in area under mulberry between 1971-72 and 1090-91 and 5.8 per annum. Production of raw silk registered an even faster growth rate of 6.5 percent per annum. The export earnings of raw silk and silk fabrics have increased nearly at 9.49 percent for Rs.7.59 crores in 1971-72 to Rs 440.53 crores in 1990-91.

Table 1.2

Progress of Sericulture in India

Year	Area Hectares	Raw silk tonnes	Export Earnings	Imports
1971-72	104885	2046	7.59	0.47
1975-76	124913	2541	17.53	0.43
1979-80	155161	4193	48.33	0.76
1984-85	214868	6895	129.05	1.10
1989-90	294241	10905	400.60	1.45
1990-91	313109	11487	440.53	1.35
Compound Growth Rate Log Y= a + bt	5.87	6.75	9.49	2.14

Source: Silk In India: Statistical Biennial 1992, Central Silk Board.

Regional Distribution Of Sericulture In India

The Table 1.3 summarises the progress of different states in the mulberry cultivation and silk-worm rearing.

Table 1.3

Share of the Major Silk Producing States in Raw silk Production in India

('000 tonnes)

Year	Andhra		J&K		Karnataka		TN		W.Bengal		Others		Total
1951/52	0.0001	(0.00)	0.54	(8.59)	4.19	(67.01)	0.00	(0.00)	1.37	(21.88)	0.16	(2.51)	6.25
1955/56	0.0002	(0.00)	0.76	(6.90)	8.35	(76.06)	0.00	(0.00)	1.64	(14.98)	0.23	(2.06)	10.98
1960/61	0.00221	(0.02)	0.88	(7.43)	8.43	(71.14)	0.02	(0.13)	2.31	(19.48)	0.21	(1.80)	11.85
1965/66	0.00859	(0.06)	0.53	(3.43)	11.55	(74.75)	0.02	(0.11)	3.12	(20.21)	0.22	(1.45)	15.45
1969/70	0	(0.00)	0.42	(2.30)	14.49	(79.48)	0.01	(0.05)	3.07	(16.84)	0.24	(1.32)	18.23
1974/75	0	(0.00)	0.71	(2.92)	20.20	(82.99)	0.10	(0.41)	3.17	(13.02)	0.16	(0.66)	24.34
1979/80	5.72	(13.64)	0.79	(1.88)	26.31	(62.75)	3.88	(9.25)	5.05	(12.04)	0.18	(0.43)	41.93
1984/85	12.5	(18.13)	0.53	(0.77)	40.59	(58.87)	7.50	(10.88)	7.17	(10.40)	0.66	(0.96)	68.95
1989/90	27.89	(25.58)	0.24	(0.22)	60.76	(55.72)	8.63	(7.91)	9.96	(9.13)	1.57	(1.44)	109.05
Average Annual Percentage Growth	101.77		-24.00		7.46		52.58		6.41		17.24		7.89

Note : Figures in parentheses represents percentage to rowtotal

Source: Silk In India, Statistical Biennial 1992.

The five major silk producers in India are Karnataka, Tamil Nadu, Jammu and Kashmir, West Bengal and Andhra Pradesh. Kashmir and West Bengal were the traditional sericultural regions of India in the pre-colonial period. Karnataka rose to prominence in the latter half of the 19th Century. By the time of Independence it accounted for nearly 70 percent of the national production. Its share continued to improve up to the 1970s reaching a high of 87 percent in 1972-73. The quantity of production increased from 19,000 tonnes in 1972-73 to 62,000 tonnes in 1987-90. Her share in the national production was only 55 percent in the latter year. Obviously the production in other states had increased much more rapidly. Before we take up the latter phenomenon, we shall examine briefly the factors which helped Karnataka to achieve the prominent position in Indian sericulture.

The long history of conscious efforts taken by the various rulers in developing sericulture as an important economic activity from the period of Tipu Sultan is one of the important factors behind the emergence of Karnataka as a prime producer of mulberry silk. A firm technical and organisational foundation for sericultural industry was laid down during the early decade of this century itself[5].

On the foundation laid down by the princely rulers of Mysore, a wide network of infrastructural facilities catering to the needs of the farmers was built up. The most important among them are (a) extension agencies like Technical Service

Centres, of around 150 Chawki Rearing Centres (CRSs) (Nagaraja Rao, 1985). (b) A wide network of seed centres with 84 grainages in public sector 653 private grainages etc (Veeriah, 1985) and (d) ensuring credit facilities[6] (Gurumallaiah, 1985) (e) ensuring a minimum price and marketing facility[7] (Sreenivasa Rao, 1985). A big leap forward in sericultural production was achieved in Karnataka to a great extent with the introduction of Karnataka Sericulture Project (KSP). The highly ambitious project with a financial outlay of Rs.80 crores under World Bank assistance helped Karnataka maintain its predominant position. The Project aimed at increasing the raw silk production, improving the economic condition of the farmers, The nature of the silk worm rearing is such that it needs round the clock attention of the rearers to reap maximum benefit.Hence a risk factor is always associated with hired labour. In Karnataka it could achieve success as the family labour participation is relatively very high. Womens' share in the total work is supposed to be around 60 per cent[8]. Along with this the relative profitability, and continuity in income (Hanumappa, 1985), have also been etc are responsible for the popularity of sericulture. The silk rearing skills that Karnataka farmers acquired through a century of sericultural experience have proved to be an important comparative advantage for the state vis a vis the new entrants into the industry.

Andhra and Tamil Nadu achieved a break through in the late 1970s. The main contributing factor for the success was the integrated approach to sericultural development taking into account various stages such as mulberry cultivation, rearing,

reeling, marketing and production of silk fabrics[9]. Tamil Nadu's second attempt, after a failure in 1972/73, had picked up. Because it was introduced at a time when prices were favourable and complementary schemes ,financial and technical assistance for farmers under various programmes like DPAP, IRDP, RLEGP etc. were also simultaneously implemented.

With the three South Indian states increasingly dominating the scene, the North Indian states of J&K and West Bengal are being pushed behind. In Jammu Kashmir there has taken place a crop shift away from mulberry to fruit trees as a result of the Mulberry law which takes away the right on the mulberry tree. Complaints have also been rampant that the cocoon growers are paid unremunerative prices (Ashan, 1992).

In West Bengal sericulture growth has been stunted as a result of distortions of commercialisation (Banerjee, 1990). Marketing is seen to be the major hurdle. The oligopolistic traders along with intermediaries exercise domination over an agrarian labour force and scuttle the extension agencies marketing services to the producers .

Problems of Sericulture in India:

As mentioned earlier the competitiveness of Indian Silk in the World market is very low. The technology conspicuous by the absence of bivoltine cocoons and dominated by the charka reeling has not been geared up to produce internationally gradable silk. Moreover the cocoon and raw silk productivity in India as a

whole and even in Karnataka are almost 50 percent lower than the levels prevailing in the countries like Japan and Korea. The main reason for the higher levels of productivity in these countries is the success of high yielding varieties of bivoltine races.

The failure in the spread of bivoltine in India and the variability in the quality of leaf, has resulted in a very high variations of leaf - cocoon ratios[10]. The problems of the non-traditional states are facing certain special problems which are briefly discussed below.

Climatic Problems: Despite a technical survey, the Cental Silk Board (CSB) has come to the conclusion that in some of the pilot districts do not have the climatic conditions needed for cultivating mulberry three to four times a year considered essential for economic viability of farming (GOI, 1992).

In the Tribal Sub Plan (TSP) area of Bihar the problem was of the topography. The good rainfall they receive could not be utilized due to the heavy run off of the soil and the resulting erosion of fertility (Gangwar, 1987).

Social Problems: Equally important are the social factors. In the TSP area they are too bound by the customs and tradition to change from their traditional routine activities. Most of the tribals adopted sericulture for the sake of obtaining subsidy (Gangwar, 1987).In Rajasthan also the same problem was faced by the extension agencies (Dandia, 1987).

Economic Problems: Marketing arrangements are of utmost necessity as the commodity is perishable by nature. Most of the new areas lack the basic infrastructure for storing and stifling of cocoons. According to the CSB except for Kerala and Maharashtra the pilot districts are away from the established cocoon markets.

Financial Problems: The initial investment capital needed is found to be a constraint (Gangwar, 1987; Acharya, 1992) The feeling of less relative profitability is the reason for the non acceptance in Dharwar (Patel, 1992).

Though for a long time sericulture was confined to the five traditional states, the Central Silk Board has decided to create a silk revolution in the country thanks to the technological breakthrough which has nullified the impact of climatic barriers. Therefore, sericulture has been introduced in seventeen non-traditional states on a pilot basis by the Central Silk Board as part of the National Sericulture Project.

SECTION II

Sericulture in The Kerala Economy

Kerala has no history of sericulture before the 1970s. Attempts of the Cental Silk Board to introduce mulberry to Wynad which is contiguous to Mysore plateau was a failure. Kerala's climate with a heavy rainfall and humidity is unsuitable for

sericulture. But the technological breakthrough in generating suitable varieties for the nontraditional agro-climatic conditions in Kerala has totally changed the scenario. Its climatic handicaps have reportedly been turned into assets. Gifted with rains from two monsoons the state receives rain six to seven months of the year with adequate precipitation. The dominant soil types of Kerala including red, sandy loam, and even laterite soil have been found suitable for mulberry. Absence of high variations in the temperature also favour mulberry growth. Thus climatic and soil factors favouring mulberry cultivation and high rainfall which had previously rendered rearing difficult are no longer so. As a result the prospects of sericulture in Kerala have also undergone a sea of change. It has also been stated that with minimal supplementary irrigation, it is possible to achieve an yield of 8000 Kgs of mulberry leaf yield and achieve a conversion ratio of 25:1 in cocoon rearing in Kerala (Government Of Kerala, 1989).

Further mulberry has been found to be an ideal intercrop for coconut. Mulberry would offer little competition to the coconut growth but would be complementary to it by effecting a better land and water management of the homestead farms. In the background of the crisis faced by the coconut economy of Kerala (Narayana et.al,1991) the supplementary income that could be generated through the mulberry cultivation would be an important contribution to farmers incomes. It has been estimated that upto half an acre can be effectively brought under mulberry cultivation in every acre of coconut i.e after leaving enough marginal space to avoid congestion.

The importance of sericulture in Kerala has also been emphasised for its employment potential. Kerala reportedly has the highest level of unemployment in the country. On the basis of NSS data, it is seen that in absolute numbers unemployed in Kerala has risen from 4.73 lakhs in 1960-61 to 5.45 lakhs in 1965 and further to 9.5 lakhs in 1972-73 (Eapen, 1979; Prakash, 1988; Mukherjee and Issac, 1992). The under employment within the agricultural sector has been on the rise. The per capita employment for agricultural labourers is the lowest in the country (Kannan, 1990). Between 1964-65 and 1983-84 per capita average employment for agricultural labourers declined by 26 per cent and rural labourers by 10 percent. The situation is found to be worse for the women labourers.

A crop mix dominated by seasonal and low labour absorbing crops is responsible, to some extent, for the reduction in the agricultural employment. The traditional industries like the cashew processing and coir are facing a crisis. The only alternative according to many is an aggressive industrialisation and for that the economy has to attract capital. But in the short run this may not be able to provide employment to all. Therefore, there has to be greater emphasis on "multiple-economic- activity families " which need less investment but produce high value products (Jeffrey, 1992). It is in this context of the need for providing employment throughout the year that, an agro-industry like sericulture assumes importance.

Diffusion Of Sericulture:

As noted earlier the attempt at diffusing sericulture in Kerala began with an unsuccessful attempt by the CSB to introduce sericulture in Wynad district But during the 1970s the nature-set barriers were overcome by the new technology of silk worm rearing. Having overcome the barrier, a second attempt was made during 1978-79 in Idukki with encouraging results. Isolated attempts by individual farmers in various parts of the state did take place. But none of these efforts could come to fruition due to the absence of the necessary infrastructure. A modest beginning in sericulture development was made during 1986-87 in Kanthalloor-Marayoor ares of Idukki District with technical assistance from the Central Silk Board. These efforts were extended to cover certain pockets of Palakkad district during 1987-88 and by the end of 1987-88 a total of 180 hectares was brought under sericulture in these two districts (Government Of Kerala, 1989).

As part of the preparatory exercise for the 8th Five Year Plan a Special Task Force for Sericulture was appointed in 1989 to look into the prospects of sericulture in Kerala. The report emphasises the need for a careful planning as sericulture is a new technology as far as Kerala farmers are concerned. The approach is one of developing sericulture clusters consisting an extent of about 500 acres irrigated as monocrop and 1500 acres (rainfed) as inter crop in the coconut gardens in each district with all infrastructural facilities like Chawki Rearing Farms, grainages and Cocoon reeling centres which will be

created by the government in the initial stages of the programme. These are expected to be the nucleus around with future developments are expected to take place (Government Of Kerala, 1989).

Since the production of raw silk is an integrated activity from mulberry cultivation to raw silk production, it was recommended that three filature in each district should be set up which will act both as the purchaser of cocoons and producer of silk. Moreover, since the strategy has been one of encouraging only bivoltine in the state, multi end basin will only be set up in these filatures. The cocoons produced will be marketed to the handloom industry within the state[11]. Emphasis is also laid on the Research and Development in the long-term interest of the industry.

Table 1.4

Area Expansion In Mulberry Cultivation in Kerala

Year	Area (acres)
1988 March	350
1989 March	1167
1990 March	2700
1991 March	4839
1992 March	13000

Source: Government Of Kerala 1989 (for years 1988 and 1989)
Government Of Kerala 1992 (for years 1990 1991 and 1992)

The state produced 51.63 tonnes of cocoons in 1992-93 (Indian Express, Aug 16 1993). Encouraged by these results the Government have raised the target from 28000 acres by the end of

the eighth plan to 50,000 acres by the end of the period[12]. Thus Kerala is on the verge of an expansionary phase in sericulture. The Khadi and Village Industries Board which was entrusted with the task of spreading sericulture has demarcated Rs. 5 crores for the development of the same for the year 1993-94.

Sericulture in Kerala is a new agro_based activity as far as the farmers of Kerala are concerned. The adoption of a new activity like sericulture will be influenced by the personal, social, cultural contexts. The economic profitability alone may not be the sole criterion. Though this is a very important consideration adoption behaviour of the farmers cannot take place in purely economic terms isolated from social and cultural consideration. It should be remembered that the economy of Kerala is unique in many respects which may have its implications on the adoption behaviour of the farmers. All these make an evaluation of the sericulture diffusion in Kerala an interesting field of exercise.

SECTION IV

Objectives of the Study:

The main objective of our exercise is to assess the experience of the ongoing process of diffusion of sericulture in Kerala on the basis of a case study of Palakkad district. Especially we hope to achieve the following:

(1) To examine the characteristics of the adopters and to study the influence of the same on the adoption behaviour of the farmers.

(2) To compare the projected returns from sericulture with those which are being actually realised by the farmers. The actual field situation may be different from the ideal situation . The non-realisation of the projected returns may be due to the following factors:

(a) low productivity

(b) high cost

(c) a low value realised by the product in the market.

Each of these factors will be examined both on the basis of the perceptions of the farmers and on the basis of the analysis of the objective data collected. In this process we would like to point out the major problems the industry faces today.

3) To evaluate the services of the extensive agencies .

In the process we hope to be able to sharply bring out the problems faced by the industry and constraints that impede its rapid spread.

Data Source:

The secondary data on sericulture in Kerala is very scanty. Our efforts to collect the primary information contained in the registers of KVIB and CSB regarding the adopters were not very successful. Therefore, our study is entirely based on the information collected in the field surveys.

The most important primary source had been Census of Sericulturist in Palakkad conducted by Integrated Rural Technology Centre (IRTC). The IRTC participatory research centre is sponsored by the Kerala Sasthra Sahithya Parishad a peoples science movement. IRTC as a component of a larger research and development activities had been imparting training to sericulture farmers. The census of Palakkad District was undertaken by the by IRTC as a component of a larger research project on sericulture in Kerala. All the farmers who are either at present or in past were engaged in sericulture were contacted and information collected. The Census was carried out by sericulture farmers who had earlier undergone training at the IRTC. Therefore, much reliability had been placed on the information generated by this Census survey.

The Census survey tried to capture only the socioeconomic characteristics of the adopters and broad technical and cultural practices. Since it was important for the analysis to have cost and profit data a sample survey of the two panchayats of Agali and Kuthannur of Mannarkadu and Alathoor Taluks respectively were conducted. Out of the total population of 96 farmers in

the two panchayats together, 59 farmers were selected at random to collect the details on the cost of cultivation and rearing. The secondary data on the number of farmers and the area under mulberry cultivation were collected from the Khadi and Village Industries Board (KVIB) respectively.

Scheme Of the Study:

The study consists of seven chapters including the present introductory chapter. In chapter two that follows is a brief overview of different perspectives on technology diffusion viz. Adoption perspective, Market Infrastructure Perspective and Economic History Perspectives. In the analysis that follows we chose to be eclectic and draw up from various strands that have been thrown up in the literature.

In chapter three, the important socio-economic characteristics of the farmers are analyzed. As will be seen in the adoption perspective the socio economic characteristics are an important influence on the demand for innovations. Followed by a discussion on the socioeconomic profile of the adopters, we shall also examine if there is any significant difference between farmers who had adopted the technology before and after the major intervention of the Government for the spread of the technology.

In chapter four, the fixed cost and the working capital of an acre of mulberry farm in the district of Palakkad is presented comparing them with the projected cost of official

document of sericulture programme in Kerala. Fairly detailed examination of the productivity and extent of self employment is also made in this Chapter. In chapter five, the major problems of sericulture as perceived by the farmers are presented and evaluated through the data presented in the survey.

Chapter six gives an analysis of the extension services in the various stages of mulberry cultivation and rearing. Since the main agencies involved are the KVIB and CSB in the two sample panchayats the analysis is confined to these two extension agencies. And, chapter seven gives a summary and conclusion drawn up from the preceding chapters.

Notes and References

1. Name of the Author	Period of study	Estimated income From sericulture
1.Hadimani.H et.al	1985	Rs.6000 for one year. per acre.
3. H.G. Hanumappa & Erappa	1986	Rs.14,000 per hectare of irrigated land
7. Khan Murtuza	1985	Net return per acre Rs 4742.59

2. Acharya J (1992) summarises suitability of sericulture for women as follows.

(1)Because it would provide employment to women either additional or a substitute over the hard working conditions of farm labour.

(2)Secondly, it would increase their income, it can improve the status of women as they will be considered productive due to their contribution.

(3)Thirdly, the conditions of work at home in sericulture are higher than farm labour and can be synchronized with other household activities (J.Acharya 1992)

3.In spite of the congruousness of sericulture to women it is seen that women's participation declines at higher stages of the production process (Tom Irene 1989).Further women are never considered managers except in the case of a village in Tamil Nadu (Govinda Raju et.al 1992). Women are generally allotted jobs like fielding, bed-cleaning and disinfection activities which generally take a subordinate position in cocoon production. Lack of proper knowledge about technology involved and lack of self-confidence are the inhibiting factors from women becoming managers. The lack of knowledge has resulted from the fact that they do not interact with extension officers, as they find it uncomfortable and nontraditional. Thus, in the grip of old customs and traditions the women in sericulture have less access to land, credit and technology.[see (Acharya J 1992) (Acharya J et.al 1992) (Ashok Kumar E.N and Gopalappa D.V 1992) (Gayathri Devi K.G and Sudhamani 1992)]Though the East India Company officials tried mulberry cultivation and rearing & made it a successful venture it did not find support due to lack of support as documented by Geoglegn, according to Charseley (1982).

4.See China: Sericulture (1980) Report of an FAO/UNDP tour to the People's Republic of China. A broken cocoon shell was unearthed in 1926, in a neolithic site in Shanci Province, and remnants of silk, velvet, ribbons and other fabric discovered in 1958 could be traced back to 2750-2850 B.C.

other fabric discovered in 1958 could be traced back to 2750-2850 B.C.

5.Though the effort of Tippu was referred to as "unsuccessful pursuit by Kirk Patric in 1811 (Charseley 1982) official patronage continued. The measures taken up by the various governments (1)Teaching sericulture as a special subject in schools, training school masters to teach the subject
(2) Setting up an official development organisation in 1911, for the development of sericulture an Agricultural Committee and an industrial and commercial committee was set up.
(3)Establishment of Research and Development station Channapatanam in 1913 for the production of dfls suitable for the climatic conditions of Karnataka.
(4)Arrangements for the supply of dfls were made.
(5) Setting up of separate sericultural department was established.

6.Medium and long term credit for raising fresh plantations of M5 variety of mulberry , purchase of rearing equipments for rearing silkworms and construction of rearing houses were provided to the farmers through three co_operative banks , seven Grameen Banks, and 16 Commercial Banks. For the convenience of the farmers the repayment period was fixed on the basis of repaying capacity of the farmers.

7. To put an end to the malpractice of the middle men, the government of Karnataka legally prohibited the cocoon sales in markets other than notified market places with reeling infrastructural facilities. There are two types based on the type of cocoons that is transacted there.(1)The Seed Area Market (2)The Commercial Area Market. A well organised network of such markets which ensured competitive prices are existing in the traditional area.The identification of the new areas led to the establishment of new markets in the non-traditional areas. Out of the 23 new cocoon markets, under KSP, 18 were in the new areas.

8.
The proportion of Hired to family labour

Name of the Author	Period of the study	Conclusion
1. Hanumappa H.G.	1986	60-65% in Mulberry cultivation and 40% in silk worm rearing.
2. Khan - Murtuza	1985	53% was family labour.
3. Nagaraj et.al.		Family labour 63 percent

9.Andhra Pradesh The key policies of the Government of AP can be summarised to the following points: the assistance by the government to sericulture development (i) installation of seed farms, (ii) rearing units, (iii) grainages, (iv) silk ruling units, (v) twisting units, (vi) cocoon markets, (vii) silk exchange, (viii) Technical services and (ix) financial assistance in the form of subsidy and loans. Sericulture has been made a part of DPAP, IRDP etc. to encourage and each small&marginal farmers.

TAMIL NADU

The main emphasis of the Sericulture department has been on the creation of additional infrastructural facilities. Mulberry cultivation was included in the DPAP, IRDP, ITDP, HADP etc.

Realising the importance of seed organisation in the development of sericultural activity, maximum importance was laid on the achievement of self-sufficiency in silkworm seed production and distribution in the state is done by the department.They were not entrusted with private preparers. To avoid the risk of diseases due to unhygienic conditions in which they are reared CRCs were also established, provided valuable technical assistance to farmers in scientific cultivation of mulberry and silkworm rearing and also marketing of their produce.

The Department of Sericulture has established number of cocoon markets in the district to enable the sericulturist to market their produce within a reasonable distance. The method of fixing floor prices of cocoons based on silk content at the prevailing silk prices was introduced in the cocoon markets in Tamil Nadu. When the market prices go below the minimum price, the cocoons are purchased by the government reeling units to safeguard the interest of the farmers. Thus, they would prevent a high flow of cocoons to Karnataka markets.

Liberal financial assistance to the extent of 50 % subsidy for the purchase of ruling basins and constructions of ruling sheds were given to private and co-operative small scale silk ruling units. As a result, of these incentives the raw silk production in the state has reached 1.65 lakhs kgs. in 1982-83 against 28,000 kgs in 1977-78.

A silk marketing federation for marketing silk produced by the Small-scale ruling units in the state was established by the end of 1978 and it continued to play a pivotal role in the procurement of silk from small-scale units and distribution of silk to handloom weavers. (Thangavelu :1987)

10.(LCR = quantity of leaf required per kg of cocoon output). The expected level of LCR for successful crop is reported to be 16:1 as accomplished by sericulturally advanced countries, whereas LCR in Karnataka is between 25:1 & 30:1.

11. Sericulture cluster in each district is to comprise the following.

1. Area 500 acres monocrop
   1500 acres intercrop
2. Seed area about 25 acres (irrigated
3. P_2 farm - 1
4. grainage - 1
5. Chawki farm cum Extension Centre - 10
6. Filatures come purchase centre

12. The target is to bring an area of 2000 acres under sericulture in each district over a period of five years (1990-95) making a total area coverage in the state 28,000 acres (11,200 ha). (State Planning Board, 1989) Separate targets were set for mulberry production and cocoons under irrigated and unirrigated lands.

(i) (a) Mulberry with supplemental irrigation: leaf yield 20 tonnes per ha. or 8 tonnes per acre.

(b) Mulberry under rainfed condition: leaf yield 10 tonnes/ ha. or 4 tonnes per ha.

(ii) Brushing not less than 800 dfls per acre in case of irrigated mulberry and not less than 400 dfls in case of rainfed mulberry.

(iii) Average cocoon yield of not less than 40 kg per 100 dfls.

(iv) Production of good quality cocoons of not less than 320 kg/acre in irrigated mulberry gardens and not less than 160 kg/acre in rainfed mulberry fields.

(v) Production of good quality silk of 35 kg/acre in the case of irrigated mulberry and 17-18 kg/acre in the case of rainfed mulberry.

CHAPTER II

PERSPECTIVES ON DIFFUSION

Sericulture is an allied activity of agriculture. In fact mulberry cultivation is in itself an agricultural process. Although there is no apparent similarity between the production of rice or wheat and the production of cocoons, Yet the underlying principles are practically the same in agriculture and sericulture. Further the operation of the law of diminishing returns inherent to agriculture is applicable in cocoon production also. Further the first two stages involved in sericulture ,(the production of raw silk) consisting of mulberry cultivation and silkworm rearing (production of cocoon rearing are carried out by peasants and other workers who generally take part in agricultural operations. Thus viewed there is an analogy between agriculture and sericulture (Rawlley, 1919). The determinants which are established to have an important bearing on the adoption of innovations in agriculture are assumed to be the determinants of adoption in the case of sericulture also. In this chapter we shall undertake a review of the literature on the different perspectives on diffusion, with special focus on agricultural innovations in order to outline broadly the factors that determine the diffusion sericulture technology -the subject matter of the study.

Diffusion - The Concept:

Generally the process of technological change is understood in the in terms of Schumpeterian trilogy of (1)invention, (2) innovation, and (3) diffusion. Invention is the process by which

new ideas are created to or developed (Rogers, 1972). An invention once made must be communicated and incorporated into technology to establish the superiority of the new technology over the existing one and this is termed as innovation by Schumpeter (Solo, 1972). Stoneman (1983) defines innovation as the development of new ideas into marketable products. Diffusion is the process by which new ideas are communicated to the members of the social system (Rogers, 1972). It is a time intensive process. But the time needed for the spread of the innovation may vary from innovation to innovation among different categories of potential adopters of a social system. There is a general consensus in the literature regarding the sigmoid i.e the S-shape of the diffusion curve (Rogers and Shoemaker, 1971: Stoneman, 1983; Griliches, 1957: Feder and O'Mara, 1982; Bera and Kelley, 1982). This is because it was always expected that in the initial stages of spread, the rate of diffusion will be at a slow rate. With the advent of the later adopters will pick up at a faster rate till it is spread among the whole of the targeted group. This would again slow down the rate of diffusion. Most of the studies on the time lag involved distinguish between the adopters as early adopters, early majority, late majority and the laggards.

Before taking a final decision whether to adopt , reject or to confirm the decision maker passes through a mental process termed the 'innovation - decision process'. Thus he undergoes a number of different stages of decision making[1]. Each stage of the diffusion-process are influenced by a number of variables which will be discussed in the following sections. Based on the different

approaches to the determinants of diffusion the literature on diffusion has been classified by Brown (1981) into the following (1) Adoption perspective (2) The Market and Infrastructure perspective (3)The Economic History perspective. The major determinants brought out by these perspectives are now discussed.

SECTION I

The Adoption perspective:-Demand factors

The adoption perspective focuses on the demand aspect of diffusion. It emphasizes the profile of the adopters, innovation characteristics. This perspective views innovation as the outcome of a learning or communication process and emphasizes the role of individual innovativeness and general propensity to innovate which are influenced by their social and economic characteristics (Brown, 1981). In the four stage classification of Rogers and Shoemaker, the individuals are influenced by a different set of factors. At the knowledge stage they are influenced by the antecedents which are defined as those variable present in the situation prior to the introduction of an innovation. These are classified as personality characteristics, social characteristics, perceived need for innovation etc (Rogers and Shoemaker, 1971).

Diffusion as a function of socio Economic Characteristics:

The relation between socioeconomic characteristics and adoption behavior in relation to agricultural innovations as established by various scholars is given in this section. The

personality characteristics which can be deduced from these studies are age, education and literacy, size of holding, tenure status, income and economic status, irrigation facilities, commercialization and attitude towards change etc. The social characteristics are cosmopolitanism, extension contact, organizational participation,etc. Influence of some of these characteristics is inconclusive.

Personal and Demographic characteristics: The following are some of the personal characteristics which are expected to have relationship with the adoption behavior.

(a) Caste: A significant relationship between caste and adoption has been pointed out by Mulay and Roy (1965) Shetty (1966), Chaukidar and George (1972), Alam (1974) Opare (1977) etc. These studies pointed out that the level of adoption was higher among the farmers who belong to the traditionally farming castes.

(b) Age: Age of the farmer is found to be an important characteristic by Shetty (1966), Ogufiditinni (1981). Some of the studies like Misra et.al (1970), Subrahmanian et.al, (1982), Supe(1971), have pointed out that there exits no relationship between age and rate of adoption. Among different age groups it was the middle age group which showed greater tendency to adopt recommended farming practices. Added to their lack of experience young people are not in a position to take decision in the presence of older people who are the heads of the families. Older farmers being too traditional and security conscious do not take the risk of adopting an innovation either (Dasguptha, 1989)

(c)Social Status: It has always been asserted that there exists a positive relationship between status and innovation. Studies like Barsen (1966), Chand.et.al (1966) and Singh (1983), have pointed out a positive relationship between these two variables. But the erstwhile belief of a linear relationship between adoption and status has been questioned by Cancian which was tested by Gastrell and Gastrell (1985). Cancian argued that there is a curvilinear relationship between status and innovation in which those of upper-middle rank innovate less than the lower-middle stratum. ie. there is an upper middle class conservatism, Freeman et.al. (1982), Gastrell and Gastrell (1985). But Cancians assertions have been proved wrong by Freeman et.al (1982).

(d) Education and Literacy: Most of the studies like Chaudhari and Maharaja (1966), Sharma and Nair (1974), OPare (1977) , Ogundifiditinni (1981), have found a statistically significant relationship between education / literacy, and the adoption behavior,the study by Alan (1965), Shetty (1966) and Shetty (1968) could find no relationship between the two variables.

(e)Attitude towards Innovation: Earlier adopters are more willing to assume the risks of innovation because they hold risk-prefer attitudes. There are two types attitudes. (1) a specific attitude towards an innovation, and (2) general attitude towards change. (Roger and Shoemaker 1971). But as far as the discontinuance of a particular practice is concerned the earlier adopters are risk avoiders (Masen and Halter, 1980). The individuals attitude has been found to be an influencing factor (Rao, 1966; Shetty, 1968; Chaukidar and George, 1972).

The discontinuance of a practice can also change the rate of adoption. There are two types of discontinuances (1) replacement and (2) disenchantment (Rogers, 1972). A replacement discontinuance is a decision to cease using an idea in order to adopt a better idea which supersedes it. A disenchantment discontinuance is a decision to cease using an idea as a result of dissatisfaction with its performance. Several investigations have determined the characteristics of those individuals with a high and low rate of discontinuance. Generally, high discontinuances have less education, low social status, less change agent contact and the like which are opposite of the characteristics of innovation.The discontinuance of an innovation is an indication that the idea was not integrated into the practices and way of life of the receivers. (Rogers and Shoemaker, 1971).

Economic characteristics: Size of holdings and income from various sources are the criteria for the measurement of the economic status of the farmers and is found to be directly correlated to the ability to afford to take risk by adopting a new idea (Dasgupta, 1989). A positive relation between farm- size and adoption rate were established by (Chaudhary and Maharaja, 1966; Shetty, 1966 and 1968; Salve, 1966; Chaukidar and George, 1972; Singh and Chaubey, 1974), could find a positive relationship between these two variables. In contrast the findings of Desai and Sharma (1966) Reddy and Reddy (1972), and Jha and Wat (1972) could not find any relationship between size of holding and adoption rate.

Other important variable determining the rate of adoption are the ownership of the operational unit of the land cultivated (Shetty, 1968), farmers' asset position and liquidity position (Shetty, 1969; Chaudhary and Maharaja, 1966).

Most of the studies have largely depended upon the individual as a unit of analysis and in so doing have tended to exclude social structural and interpersonal variables. (Roger and Shoemaker, 1971). Hence a cluster of variables had been used to study the behaviour of Iowa farmers by (Abd-Ella et al., 1981). But there is always an interrelation between the variables themselves. Since the size of holding and income are indicators of economic status of the farmers there is every possibility that the relationship between the two will together determine the adoption behavior. The above mentioned variables together can explain the possibility of having higher education and the development of a favourable attitude towards acceptance of risk. It has been suggested that there exists a two way relationship between economic status and adoption behaviour. The farmers with higher economic status adopt agricultural innovations which result in a higher income for them. Greatest profits go to the first to adopt;therefore innovator gains a financial advantage through his innovations (Rogers and Shoemaker, 1971).

Social characteristics:- The contacts with the extension agency and the outside world the perception of the farmer regarding the innovations , his knowledge, and hence the decision making were all found to have a positive relation with the average index of adoption by Singh et.al. (1966), Sharma and Nair (1974).

Uncertainty regarding the reaction of the society towards the adoption of a new innovation tended to prevent the farmer who was bound by the custom and tradition to accept it. Therefore, the conformity of the practice with the communities norms and culture was found to be a significant determinant of acceptance.

Village Economic Development variables: One of the central attributes of social structure is that of social power distribution. Studies have shown that inequality in the distribution of farm capital across a sample of village communities in India, inequality in the distribution of knowledge about modern agricultural technology, and inequality in average households, capital combined to impede the differences of innovation (Freeman et.al, 1982). People of more similar social status are more likely to share information and provide social support necessary to the reduction of risk involved in the adoption of new practices (Freeman et al, 1982).The degree of village socio-economic development (as indexed by the relative wealth of individual villages, and the presence of such indicators of wealth as electricity in the village, etc.) is found to be positively related to the success of village programs of agricultural change in the villages of Brazil, Nigeria, and India (Herzog, 1972)

The degree of village institutional development is also found to be positively related to the success of village programmes of agricultural change.

A key figure in the communication process is the opinion leaders. At the persuasion stage the homophyly between him and the

change agent counts a lot (Rogers and Shoemaker, 1971). Homophyly is the degree to which pairs of individuals who interact are more similar in certain attributes such as beliefs ,values education,social status etc Some of the common characteristics present in him and the innovator like high education level, financial level, less risk-orientation, makes him adopt a new innovation if he is convinced about the idea and tries it and once he is able to establish the superiority of the idea, it is a case to the rest of the community so that it is an acceptable idea. (Solo and Roger, 1972). Leaders characteristics like Leaders modernization leaders' consensus (on village problems)usually has a positive relation to the adoption behaviour.

Characteristics of Innovation:

The perceived characteristics of innovation which are supposed to influence the rate of adoption are (1)relative advantage, (2)compatibility, (3) complexity, (4) trialability, (5) observability (Rogers and Shoemaker, 1971).

While analyzing the spread of hybrid corns Griliches (1960) asserted that the most important factor influencing the adoption behaviour of the farmers is the profitability of the innovation. But the profitability intern depends on the market for the product it helps to produce.According to Griliches ,it is this which explains why hybrid corn innovated in Connecticut did not flourish there. Related to profitability is the cost of entry . Lower cost of entry attracts more adopters.For equally profitable innovations

the acceptance depends on the quantity of initial investment needed i.e. the proportion of hold outs will be high for those requiring relatively high investment (Mansfield, 1961).

Relative advantage or the profitability of innovation has a number of different dimensions like the degree of economic profitability, low initial cost, lower perceived risk and economic incentives associated with it, saving in time and effect and the immediacy of reward etc (Roger and Shoemaker, 1971). Kivlen Fliegel (1967) states that small scale farmers who are presumably oriented less towards profit maximization in the U.S. find that it is the decrease in discomfort, and not economic profitability which is positively related to rate of adoption. (Roger and Shoemaker, 1971). According to Shultz (1964), socio cultural variables do not at all influence the rate of adoption and relative advantage is the only attribute of innovation affecting their rate of adoption.

The positive relationship between adoption and relative advantage has been verified by Rao (1966), Gort and Keppler (1982). A study on the influence of mechanical skill on use and adoption of no-till revealed that the mechanical activity is positively correlated with the time of finest use of no-till and discriminates between users and non-users of no-till (Carlson and Dillman, 1988). The degree of complexity of a farmers' mechanical abilities appears to be most important between the trial and adoption stage in the diffusion process.

Thus from the above it could be concluded that Adoption perspective on diffusion concentrates on the demand aspect

including the individual characteristics and the characteristics of the society which influences them in their decision making process.

SECTION II

The Market and Infrastructure Perspective - The Supply Factors:

While the adoption perspective is based on the assumption that all have an equal opportunity to adopt; But the opportunity to adopt in many cases is unequal is the presumption on which market infrastructure is based. This perspective examines the supply side of the diffusion process.

First stage in the diffusion process is the establishment of the diffusion agency through which the innovation is made available to potential adopters. These agencies which make the innovation accessible to the potential adopters determines the constraints within which the innovations are adopted. The diffusion agencies influence the adoption behaviour through (1) their establishment in a geographical area and (2) the strategies which they adopt (3) the Organizational structure of the diffusing agency; and (4) the market structure of the diffusing agency (Brown, 1981). The establishment in the geographical area makes the innovation available in the area and determines the spatial diffusion of innovation.

Diffusion strategies of the diffusing agencies may be many and varied. But four are very important. They are the following:

(1) Development of infrastructure and organizational capabilities: Already available infrastructure like rural roads, water supply , electrification etc., and the policy of any public or private agency regarding any of these can leave an impact on the rate of diffusion. Diffusion can be infrastructure constrained or infrastructure independent .

(2) Pricing:Pricing as price charged for the innovation can change overtime and according to the location of the potential adopter.

(3) Promotional communications : They are employed to provide individuals with information about the innovation and to persuade them to adopt. The impact of information on the adoption decision can vary according to the channel, content, source and motivation of the diffusion agency.

The communication channels that are utilized to diffuse an innovation have an important bearing on the rate of adoption. Various channels of communication obtained are mass media, interpersonal local contact, extension contact etc.These were found to have a positive impact on the adoption decision (Sharma and Nair 1974) . The inter personal dealings seem to have more favourable impact on rapid diffusion than mass media, which in many cases will be unavailable to the farmers. The degree of change agent contact with clients is positively related to the success of village programs (Herzog, 1972). Mass media channels such as agricultural magazines were found satisfactory for less complex innovation and also in cases where the objective of the agency is to reach a more spatially dispersed audience,but as the complexity increased it

needed more or interpersonal interactions as perceived by pertinent others 1968 (Roger and Shoemaker, 1971; Brown, 1981).

(4) Market selection and segmentation i.e., identification of the clientele for the innovation and targeting in differential ways upon the segments of that clientele.

The Organizational structure: Organizational structure of the diffusing agency is an essential element of diffusion process (Stoneman, 1987) since it can influence the pace of diffusion.It can be (a) centralized decision-making structure, (b) Decentralized Decision making structure with a co-ordinating propagator (c) decentralized decision making structure without a coordinating propagator.

The structure of the diffusing agency has its implications on the spatial pattern of diffusion, since in diffusion under a centralized decision making structure, a single propagator determines the number of diffusion agencies to be established and their location, size and other characteristics. Here capital availability, sales potential, and the elasticity of agency profitability are important determinants of diffusion. [illegible]

In the case of decentralized decision making system with a coordinating propagator where vital decisions depends on the entity the information flows, incentives, the diffusion pattern is influenced by the decision of coordinating propaganda (Brown, 1981)

Apart from the structure of the Diffusing Agency, the number of suppliers will also be the determinant of diffusion (Mansfield, 1968).

From the above discussion it is clear that both demand and supply forces are equally important in the diffusion of a technology.But the questionable assumptions on which these two are based is that they assume innovation to be static. Through the process of learning by doing it is possible that the innovation may undergo changes. This dynamic nature of the innovation process is not taken into consideration by these two approaches. This loophole is taken into consideration by the Economic History Perspective.

SECTION III

The Economic History Perspective

This approach deviates from the previous two perspectives in that it perspective treats innovation as a continuous entity. According to this perspective the form and function of the innovation and the environment into which it is introduced are under continuous modification. Each improvement over the previous one is accepted as the cost creation of the new to the old decreases. Improvements brought about by the users are to eliminate the defects embodied in the innovation at the early stages of its adoption and to make it more compatible to the environment to which it is being introduced. The costs accordingly are divided into exogenous and endogenous. The endogenous cost relates to the

productivity and exogenous to the price of the required inputs or the relative factor costs.

The continuity of innovation affects the special pattern of diffusion in two ways (Brown, 1981)

(1) On the Supply side at the time of introduction of an improved innovation, it has a direct bearing on individuals or market, who adopt it directly.

(2) On the demand side, even after the innovation is made available, potential adopter individuals or firms delay their decision expecting further improvements and reduction in the cost ratios. Similarly the expectation of improvement in the old technology may delay the acceptance of the new technology. But this is not to be considered as an irrational behaviour on the part of adopters.

Economic historians consider the following Six factors to be important determinants of diffusion, five of which are endogenous and the last one is exogenous.They are

(1) continuity of incentive activity
(2) Development of technical skill among users of the innovation
(3) Development of skills in machine making
(4) The complementarities which relax and enable the bypassing of constraints that develop in the course of applying the new technology

(5) Further improvements of the replaced innovation

(6) The exogenous determinant - institutional factors which are outside the innovations production process. These factors can alter the adoption of the innovation either in favour or against it. The change in institutional arrangements may be necessary for the realizing the benefits of a technological changes or the technological change,by providing an opportunity to increase profits, may be an impetus to innovate a new institutional arrangement. This is in consonance with the Schumpeterian observation of a source of disequilibrium in the economy.

SECTION IV

Complementarity Between Perspectives

From the above discussion it could be concluded that there is a close affinity between the various perspectives in technology. Each perspective emphasizes the different aspects of the diffusion process. They differ in their explanation of the initial slowness of the diffusion curve. The initial slow growth of the `S' shaped diffusion curve, according to the economic historians, is the reflection of the time needed to improve the innovation and adopt it to a variety of potential markets or uses, and delays caused by the expectation of further improvements. The adoption perspective attributes the flatness of the S shaped curve to the innovative characteristics of adopters. The market infrastructure attributes it to the establishment of diffusion agencies and their strategies. The `bandwagon effect' after the initial resistance is explained by

the economic history perspective by the development of technical skill among the users. The Retardation in the adoption rate is the result of the expectation of further improvements in innovation, according to the economic historians. This complements the `adoption perspective' in that such expectation is a critical element in the potential adopter's calculation of profitability.

The second economic history explanation of the flatness of S-curve is that improving the innovation and adapting it to a variety of potential markets and uses takes time. This complements the explanation of the market and infrastructure perspective.

Much of the earlier literature on diffusion especially on developing countries is focused on the social-psychological aspects of diffusion process which sought to explain relative rates of diffusion interms of the effectiveness of the "communication system" and personality traits of the adopters (Barnett, 1990; Agarwal, 1983). Now the emphasis has shifted from the personality traits to the characteristics of the technology being diffused, and how far technology is capable of fulfilling the needs of the adopters concerned. Another aspect of changing perspective of technological change is the widespread recognition that the adaptation of some of the technologies is often a necessary condition for their diffusion i.e the adaptation to meet the local conditions is often necessary condition for their technologies.At the same time it does not undermine the adopter characteristics.

Moreover in developing economies the diffusion of a new technology should not be left to the market forces because the

targets of the rural technologies are outside the monetary economy with very limited income (Barnett, 1990). In developing economies pressure of the market forces to innovate may be less. Usually adoption takes place in conjunction with the pressure form outside agencies like Government or Non Governmental Organizations. Therefore in the diffusion of any rural technology the following holds a very important role (1) the policies of the Government regarding the technology being diffused, (2) the diffusion strategies of the institutions involved, (3) performance of the technology (4) the political economy in which it is being diffused, (5) macro policy environment etc..

Therefore, in the following analysis we are trying to examine the influence of the adopter characteristics, the performance of the technology in fulfilling the perceived needs of the adopters, and the functioning of the diffusing agencies on the diffusion of sericulture in Kerala.

Notes

1.The traditional view as expressed by Ryan and Gross consists of five stages: (1) awareness stage, (2) interest stage, (3) evaluation stage, (4) trial stage and (5) adoption stage. But the five stage conceptualization of the adoption process has been criticized and 4 stage process has been evolved by Roger and Shoemaker (Rogers and Shoemaker 1971) . They are (1) knowledge (2) persuasion (3) decision (4) confirmation.

CHAPTER III

SOCIO-ECONOMIC PROFILE OF THE ADOPTERS

Diffusion has been defined as the process of acceptance over a period time of some specific system or idea or practice by individuals, groups or other adopting units, linked to specific channels of communication to a social structure and to a given system of values or culture (Dasgupta, 1989). Thus adoption units are an important component of the whole process of diffusion. Thus it follows that the adopting units of an innovation may be individual, groups or communities. In this study a household has been taken as the unit of adoption since it has been assumed that the decision of the individuals might be the result of a degree of joint decision-making within the family. Therefore, characteristics of the household are taken up for analysis in this chapter. Socio-economic characteristics are proved to have important bearing on the adoption behaviour of the farmers. Majority of the Indian studies have assumed that the characteristics which distinguish adopters from non-adopters also differentiate adopters of different degrees of innovativeness. The socio-economic characteristics which are expected to have an important bearing on the adoption of innovations in agriculture have been taken to be the relevant ones in the case of sericulture also. The analogy between agriculture and sericulture has already been mentioned in Chapter II.

Following a general discussion of the socio-economic characteristics of the adopters in Section I we shall go on to examine their likely influence on innovativeness as indicated by the period of entry into sericulture (Section II) and rate of

adoption in (Section III). As regards the rate of adoption we have examined only one of the attributes, namely, the proportion of the land of the adopter that has been converted for mulberry cultivation. The data were found to be inadequate for a more comprehensive analysis of adoption quotient taking into consideration the various elements in the package of practices.

Our analysis is handicapped by the fact that there is no secondary information as regards the socio-economic characteristics of sericulturists in Kerala. All that we have are the data in the registers of the KVIB and CSB regarding the adopters who had sought their help. The data were seen to be of uneven quality and coverage and in certain districts were not made available. The only information that could be collected was the addresses of the registered adopters and area under mulberry cultivation in their farms. Therefore, our discussion is entirely based upon the census of sericulture adopters in the district of Palakkad. We have already discussed the nature of the survey in the introductory Chapter I.

The census could identify 487 farmers who had adopted this new technology. The earliest entrant to sericulture was in 1983. Till 1988 the increase in the numbers was very slow and the early entrants including those in 1988 constitute only 14 percent of the total adopters (Table 3.1). A break occurs in 1988, the year in which the governmental agencies began to actively intervene in the propagation of sericulture. The post-1988 period also coincides with the active entry of Central Silk Board (CSB) in the propagation of sericulture in Palakkad which had been selected as

one of the pilot districts under the National Sericulture Project (NSP).

Table 3.1

Frequency Distribution Of Entry Into Sericulture

Year	No. New Entrant	Cumulative No. of Farmers	Percent Change	Gross Area (inacres)	Cumulative Percent	No. abandoned	Area Gone Out of Cultivation
1983	1	1	0.21	0.5	0.08		
1984	2	3	0.62	1.50	0.24		
1985	12	15	3.08	11.50	1.86		
1986	5	20	4.11	15.55	2.51		
1987	14	34	6.78	33.65	5.43		
1988	30	64	13.14	85.30	13.77		
1989	104	168	34.49	276.33	44.60		
1990	117	285	58.52	347.85	56.14	1	2.50
1991	105	390	80.98	499.94	80.68	5	1.65
1992	97	487	100.00	619.64	100.00	104	95.48
	487						
Net area gone out of cultivation				75.02			

Source: Census of Sericulturists in Palakkad, 1992.

The increase in the area also broadly follows the trend in the number of adopters. The farmers numbering 487 had brought an area of 619.64 acres of land under mulberry cultivation. In the tables that follow in the rest of this Chapter, the standardised area under mulberry using the following conversion norms are used. One acre of irrigated mono-crop of mulberry is taken to be equivalent to two acres of unirrigated mono-crop mulberry or two acres of irrigated inter-crop mulberry or four acres of unirrigated inter-crop mulberry (Government Of Kerala, 1989).

Out of the 487 adopters identified 110 farmers had already abandoned sericulture by the time of the survey. The characteristics of the adopters who had dropped out and the reasons for the phenomenon are discussed in the Chapter V. In the ensuing

discussion of the present chapter no distinction is made regarding the sericulturists who are continuing and those who had dropped out.

SECTION I

Socio-economic Characteristics Of Sericulturist:

Religion and Caste:

Caste constitutes one of the most fundamental structural features of the Indian rural society. Many of the earlier studies have shown a significant association between caste and adoption behaviour as there has always been an overlap between caste, occupation and tenure status. Table 3.2 reveals that most of the adopters belong to the backward caste of Hindu religion. The Christians and Muslims form only 14.6 percent and 9.0 percent respectively. The proportion of the Christians in the sericulture activity is more than their percentage share in the total population of the district. These Christian farmers are generally the more enterprising migrant settlers from the southern part of Kerala. Among the Hindu adopters 59.3 percent are from the backward castes. It is not surprising, as Palakkad is an area dominated by the Hindu backward caste households who gained land under Land Reforms. The representation of the schedule castes and schedule tribes among the adopters is only 6.4 percent, whereas in the entire population they come to 19.82 percent as per the 1981 census.

Table 3.2:

Distribution of Adopters on the Basis of Caste and Religion

Sl. No.	Religion	Caste							Percentage Distribution of District population by religion
		Forward		Backward		SC/ST		Total	
1	2	3	4	5	6	7	8	9	10	11
1.	Hindu	122	(32.9)	219	(59.0)	30	(8.1)	371	76.18	73.11
2.	Christian	69	(95.8)	3	(4.2)	-	-	72	14.78	3.75
3.	Muslim	10	(22.7)	33	(75.0)	1	(2.3)	44	9.04	23.13
4.	Others	-	-	-	-	-	-	-	-	0.01
5.	Total	201	(40.5)	255	(52.5)	31	(6.4)	487	100.0	100.0

Note : Figures in paranthses represents percentages to row total.
Source: Column 11:Census of India 1981, Series 10, Kerala, p.260.
Source: same as for Table 3.1.

Education

Table 3.3 reveals the educational status of the farmers.Around 8.9 percent are illiterate and 58.4 percent have qualification below matriculation. It is also seen that educational qualification level of the families tend to rise with land size class.

Table 3.3

Education Of The Members Of The Households By Landsize Classes

Level Of Education	Land Holding Size Classes (in acres)					
	lessthan.5	.5-1.00	1.01-2.50	2.51-5.00	Above 5	Total
Illiterate	17 (16.50)	20 (14.39)	67 (11.30)	78 (9.12)	35 (4.66)	217 (8.89)
1-4	17 (16.50)	26 (18.71)	73 (12.31)	120 (14.04)	65 (8.66)	301 (12.33)
5-7	15 (14.56)	19 (13.67)	101 (17.03)	140 (16.37)	107 (14.25)	382 (15.65)
8-10	31 (30.10)	41 (29.50)	191 (32.21)	235 (27.49)	241 (32.09)	739 (30.27)
Matriculate	12 (11.65)	14 (10.07)	89 (15.01)	156 (18.25)	169 (22.50)	440 (18.03)
Degree	2 (1.94)	5 (3.60)	14 (2.36)	47 (5.50)	73 (9.72)	141 (5.78)
PostGraduat	0 (0.00)	1 (0.72)	2 (0.34)	10 (1.17)	7 (0.93)	20 (0.82)
Technical Education	(0.00)	3 (2.16)	14 (2.36)	17 (1.99)	21 (2.80)	55 (2.25)
Professional Education	(0.00)	1 (0.72)	1 (0.17)	7 (0.82)	6 (0.80)	15 (0.61)
Others	9 (8.74)	9 (6.47)	41 (6.91)	45 (5.26)	27 (3.60)	131 (5.37)
Total	103	139	593	855	751	2441

Note :Figures in parenthesis refer to percentage share in the total for the column.
Source: same as for Table 3.1

Economic Attributes

Economic attributes such as landownership and income of the households are increasingly overshadowing the caste divisions in the dynamics of rural households. Owners and operators of large-sized farms have economic resources and can afford to take the risk involved in trying out the new idea or practice. Most of the agricultural innovation require substantial economic resources and a relatively large-sized operation for their adoption and use. However, the data presented in Table 3.4 reveals that most of adopters of sericulture come from the low income brackets. A distribution of the adopters by income classes shows that 29.2 percent of them has income below Rs.500/- month. As the income increases the proportion of adopters declines.

Table 3.4

Distribution of Farmers Across landholding and Income classes

(Rs. per month)

Land Size	Income classes						
Classes (area in acres)	N.A	Less than 500	501 to 1000	1001-1500	1501-2000	2001-4000	Above 4000	Total
0 - 5		17(77.3) (8.3)	3(13.6) (2.1)	1(4.5) (2.3)	1(4.5) (2.2)	-	-	22(100) (4.5)
51-1.00		16(53.3) (13.7)	11(36.7) (7.9)	1(3.3) (4.5)	1(3.3) (2.2)	1(3.3) (3.3)	-	30(100) (6.2)
1.01 - 2.50		86(67.7) (42.0)	27(21.3) (19.3)	3(2.4) (6.8)	3(2.4) (6.7)	7(5.5) (23.3)	1(0.8) (5.0)	127(100) (26.1)
2.51 - 5.00	1(.6)	70(42.4) (34.1)	40(24.2) (28.6)	21(12.7) (47.7)	14(8.5) (31.1)	10(6.1) (33.3)	9(5.5) (45.0)	165(100) (33.9)
Above 5	2(1.4)	16(11.2) (7.8)	59(43.0) (42.1)	18(13.2) (40.9)	26(21.1) (57.8)	12(8.4) (40.0)	10(7.0) (50.0)	143(100) (29.4)
Total	3	205(29.2)	140(21.4)	44(9.4)	45(9.2)	30(5.5)	20(2.5)	487(100)

Note : Figures in the bracket gives column and row percentages

Source: Same as for Table 3.1

However, the distribution of Sericulture farmers by the area of landholding reveals a different picture. It is seen that 63.3 percent of the adopters hold more than 2.50 acres of land. In the State at large such larger-size holders comprise less than 6 percent of the total land holdings. However, it could be gathered from Table 3.4 that the correlation between average size of holding and average size of income is very weak. It is seen that 86 farmers with more than 2.50 acres of land have a monthly income of less than Rs.500 per month. It makes us suspect that there has been an understatement of the income given by the respondents. Unlike

the data on the distribution of income classes, it is not the poorest strata of landholders, but the medium-size holders who have been in the forefront of adopting this technology.

Table 3.5

District Wise Distribution of Adopters by the Area under Mulberry Cultivation

Sl. No.	District	Land Size Classes					Average size	Total No. of farmers	Total Area (acres)
		0 - .5	.51 - 100	1.01 - 2.50	2.51 - 5.00	75			
1.	Kottayam	192(48.9)	148(37.7)	49(12.5)	3 (0.8)	1(0.3)	0.84	393	331.40
2.	Kasargode	83(55.0)	64(42.4)	4(2.6)	-	-	.61	151	92.80
3.	Ernakulam	149(27.2)	231(42.2)	157(28.6)	9 (1.6)	2(.4)	1.23	548	671.85
4.	Pathanamthitta	95(48.2)	53(26.9)	42(21.3)	6 (3.0)	1(.5)	1.09	197	214.88
5.	Thrissur	175(33.0)	282(53.1)	65(12.2)	9 (1.7)	-	.84	531	445.45
6.	Wyanad	11(16.9)	25(38.5)	26(40.0)	3(4.6)	-	1.40	65	90.77
7.	Kozhikode	232(48.8)	180(37.9)	48(10.1)	12(2.5)	3(.6)	.92	475	437.86
8.	Malappuram	234(63.4)	96(26.0)	34(9.2)	5(1.4)	-	.78	369	289.17
9.	Alappuzha	149(38.0	200(51.0)	39(9.9)	3(.8)	1(.3)	.83	392	326.97
10.	Thiruvananthapuram	341(49.9)	237(34.7)	89(13.0)	12(1.8)	4(.6)	.93	683	634.36
11.	Kollam	31(19.5)	71(44.7)	40(25.2)	16(10.1)	1(.6)	1.32	159	201.31
12.	Palakkad	90(18.5)	219(45.0)	150(30.8)	22(4.5)	6(1.2)	1.02	487	619.47

Note : Figures in parenthesis refer percentage to row total.
Data on Kollam relates to rearing farmers only
Source: The list of farmers from the respective KVIB Offices.

A comparison of the size distribution of sericulturists of Palakkad and other districts of Kerala is given in Table 3.5. The data for Palakkad has been taken from the census of sericulture farmers by IRTC, while the data for the districts refer to farmers who had registered with KVIB. Data for Idukki and Kannur could not

be collected. A major defect of this data is that it is not based on the total land holdings but area under mulberry cultivation. Therefore, it would tend to understate the incidence of largescale holdings in the distribution . The Census of sericulture farmers in Palakkad district shows 22.67 percent of the land owned by the farmers was converted to mulberry cultivation. Keeping the above limitation of data in mind, the following conclusion can be drawn regarding the size distribution of sericulturists in Kerala. It would appear that the size distribution of Palakkad district is more dominated by larger holdings than the rest of the state. While in the state, the area of the mulberry plot of 40.04 percent of the holders are not more than half an acre, in Palakkad the share of such small scale land holders is only of 21.8 percent. In Wyanad and Kollam districts also the number of small holders is relatively small. But in the case of Malappuram district mulberry plots of less than .50 acre constitute as much as 63.4 percent of the total holdings. If we examine the average size of holdings of column 8 of Table 3.5, Palakkad, Kollam, Thiruvananthapuram and Ernakulam are seen to be of relatively larger size. To conclude, eventhough the size structure in Palakkad is dominated by medium farmers of more than 2.5 acres small and marginal farmers do constitute a significant proportion of sericultural farmers in the state as a whole.

Not surprisingly, except for a very small percentage of the farmers all had garden lands. But 34.1 percent did not have paddy land. (Table 3.6). Table 3.6 also shows the proportion of paddy land owned by large sericulture farmers is relatively higher. Similar is the broad relationship between the proportion of area

under waste land and land size groups.

Table 3.6

Distribution Of Adopters By the Possession Of The Type Of Land
(area in acres)

Landholding classes	Type Of Land			Average holdin of different type's ofland		
	Paddy Land	Garden Land	Waste Land	Paddy	Garden	Waste
1. 0 - .5	54(11.0)	54(11.1)	19(3.9)	.03	.36	.02
2. .51 - 1.00	77(15.8)	88(18.3)	16(3.3)	.12	.80	.67
3. 1.1 - 2.50	92(18.9)	145(29.6)	8(1.6)	.59	1.23	.04
4. 2.51- 5.00	78(16.0)	112(25.1)	11(2.3)	1.47	2.20	.11
5. Above 5	20(4.11)	66(13.6)	6(1.2)	2.82	6.32	.93
6. zero Holdings	166(34.1)	22(4.5)	427(87.7)			
7. Total	487	487	487(100)			

Note :Figures in parenthesis refer to percentages in the column total.
Source: same as for Table 3.1.

Eventhough mulberry can be cultivated as an intercrop in coconut and arecanut lands or other homestead tree crops of Kerala, it can be seen that, (Table 3.7) in 48 percent of the cases, mulberry was introduced substituting paddy and pulses. In another 13 percent of the cases mulberry has substituted crops like banana, vegetables and tubers which are grown mostly in the paddy lands itself. In 20 percent of the cases it was reported that no other crop was being cultivated previously in the land allocated for mulberry. We suspect a number of cases where mulberry was introduced as an inter-crop would have been misclassified into this category. Surprisingly, only in less than 10 percent of the cases mulberry was introduced as an intercrop. It is also interesting to note that the proportion of mulberry substituting paddy crop on the whole is relatively lower in the higher size classes.

Table 3.7

Distribution of Number of Cases of Crops Substituted By Mulberry

(area in acres)

Land Size Classes	Paddy	Banana	coconut	vegetable	Pepper	Rubber	Waste	Total
Less than .5	11 47.83	2 13.	1 8.7		1 0.04		7 30.43	22
0.51-1	16 53.33	4 13.64	4 13.64		1 3.3	1 3.3	4 13.33	30
1.01-2.50	61 48.04	23 18.1	14 11.02	1 0.78	1 0.78	1 0.78	26 20.5	127
2.51-5.00	84 50.91	17 10.4	17 10.4	1 0.7	0 0	13 7.59	33 20	165
Above 5	62 40.36	23 15.79	23 15.79	3 1.75	0 0	12 8.77	20 17.54	143
Total	234 48.05	69 14.17	59 12.11	5 1.03	3 0.41	27 5.54	90 18.48	487

Note : Figures in parenthesis refer to percentages to row total

Source: same as for Table 3.1

The main source of income: The distribution of adopters by main source of income is given in Table 3.8. The main source of income of 58.3 percent of the farmers is agriculture and allied activities majority of whom earn a low level of income between Rs.500 to below Rs.1000 per month. Sericulture being basically an agricultural activity, it is only natural that the adopters are drawn mainly from the peasant community. The main source of income of a minority of 17.2 percent is sericulture. Table 3 reveals that sericulture is a subsidiary source of income except for 17.2 percent of the farmers.

Table 3.8

Distribution of Adopters by the Main Source of Income

Sl.No.	Source of income	Number of households	
1.	Sericulture	84	(17.2)
2.	Other Agricultural operations	284	(58.3)
3.	Wage labourers	39	(8.0)
4.	Salary	30	(6.2)
5.	Pension	15	(3.1)
6.	Trade	6	(1.2)
7.	Commerce	3	(0.6)
8.	Self employment	14	(2.9)
9.	Others	9	(1.8)
10.	Not Available	3	(0.6)
11.	Total	487	(100.0)

Note: Figures in parenthesis refer to percentages in the column total.

Source: same as for Table 3.1

SECTION II

Differences Between Early and Late Adopters

The adopters are classified as early and late adopters based on the `innovativeness scale' suggested by Rogers and Shoemaker. The basic assumption underlying the construction of of `innovativeness scale' is that farmers can be arranged in a continuous scale in terms of the degree to which each of them is relatively earlier to adopt a new idea than other members of the social system. It was assumed that adopter distribution assumes a normal distribution curve when plotted over time on a frequency basis (Dasgupta 1989). In this study the classification of the farmers into early and late adopters is not based upon such rigorous definition prevalent in the literature. The diffusion of the technology has not yet reached the take off stage and therefore all the adopters in our analysis are strictly speaking early adopters or innovators. We have chosen to divide the adopters into two: those who entered before 1989 and those who entered in 1989 or after. The rationale for this division is that it was in 1987-88 that intensive promotional campaign to promote sericulture was initiated by the government. Pre 1988 entrants are descriptively titled as early adopters and the others as late adopters.

Table 3.9

Distribution of Early and Late Adopters by the Possession of Different Types of Land

Landholding size Classes	Type Of Land Possessed											
	Paddy Land			Garden land			Waste Land			Total Land		
Adopter Classes	Early	Late	Total	Early	Late	Total	Early	Late	Total	Early	Late	Total
1.Zero holdings	31 (48.4)	135 (31.9)	34.1	2 (3.1)	20 (4.7)	0.22	57 (89.1)	372 (87.9)	88.1	- -	- -	
2. <0.5	10 (15.6)	44 (10.4)	11.1	14 (21.9)	40 (9.5)	11.1	3 (4.7)	15 (3.5)	3.7	9 (14.1)	13 (3.1)	4.5
3. 0.51 - 1.0	5 (7.8)	72 (17.0)	15.8	9 (14.1)	79 (18.7)	18.1	2 (3.1)	13 (3.1)	3.1	4 (6.3)	26 (6.1)	6.2
4. 1.01 - 2.50	10 (15.6)	82 (19.4)	18.9	15 (23.4)	130 (30.7)	29.8	2 (3.1)	6 (1.4)	1.6	16 (25.0)	111 (26.2)	26.1
5. 2.51 - 5.0	5 (7.8)	73 (17.3)	16.0	12 (18.8)	100 (23.6)	23.0	- -	11 (2.6)	2.3	15 (23.4)	150 (35.5)	33.3
6. >5.0	3 (4.7)	17 (4.0)	4.1	12 (18.8)	54 (12.8)	13.6	- -	6 (1.4)	1.2	20 (31.3)	123 (29.1)	29.4
7. Total	64 (100)	423 (100)	100	64 (100)	423 (100)	100	64 (13.1)	423 (86.9)	100	64 (100)	423 (100)	100 100

Note: Figures in parenthesis shows percentages to column total
Source: same as for Table 3.1

Sixty four of the sericulture farmers had entered the field before 1988 the rest nearly 87 percent had adopted sericulture following the intensive promotional programme in the subsequent period. Table 3.9 shows that there was discernible difference in the land size distribution between early and late adopters. 14 percent of the holdings of the early adopters were less than .50 acre in size. the proportion of such tiny holdings among late are early 3.1 percent. On the other hand, holdings larger than totals 2.50 acres in size constituted nearly 65 percent of the late adopter holdings while the ratio was only 55 percent for the early adopters. The proportion of adopters without paddy land is also relatively higher among the early adopters.

Table 3.10

Distribution of Adopters By Year Of Adoption and Land Holdings

Year of Adoption	Land Size Classes (in acres)										Total	Average mulberry area	Average Land Holding
	<0.5		0.51-1.0		1.0_2.5		2.51-5		>5	% Total			
Before 1985	-	-	-	-	-	-	3	(100.0)			3	.50	2.83
1985	4	(33.3)	1	(3.3)	2	(16.7)	2	(16.7)	3	(2.5)	12	.75	3.37
1986	1	(20.0)	1	(2.0)	-	-	2	(40.0)	1	(2.0)	5	1.02	4.17
1987	1	(6.3)	4	(12.5)	4	(31.3)	5	(31.3)	3	(18.8)	14	1.19	3.29
1988	3	(10.0)	-	-	8	(26.7)	6	(20.0)	13	(43.3)	30	1.45	4.38
1989	3	(2.9)	10	(9.6)	24	(23.1)	38	(36.5)	29	(27.9)	104	1.20	5.33
1990	2	(1.7)	4	(3.4)	29	(24.8)	49	(41.9)	33	(28.2)	117	0.98	5.48
1991	3	(2.9)	8	(7.6)	25	(23.8)	28	(26.7)	41	(39.0)	105	1.11	5.34
1992	5	(5.1)	4	(4.1)	34	(33.7)	32	(35.7)	20	(20.4)	97	0.70	3.44
Total	22	(4.5)	30	(6.2)	127	(26.1)	165	(33.9)	143	(29.4)	487	1.02	4.80

Note :figures in parenthesis refer to percentage to row total
Source: Same as for Table 3.1.

The relationship between size of land holding and the period of adoption is even more sharply revealed in Table 3.10. It shows that the proportion of holdings below 0.5 acre and 0.5 to 1 acres have tended to decline over time. In contrast the proportion of holdings between 1 to 2.5 acres and above 2.5 acres have generally tended to increase. Further, it is also seen that the average size of holdings by the year of entry shows a systematic tend to rise. The average size have more than doubled from 2.83 in 1983 to 5.48 in 1990 and 3.44 in 1992. The above finding runs counter to the normal understanding, of the innovation theory that suggests large land holders are more dynamic and tend to perceive profitable opportunities.

There is also remarkable contrast between early and late adopters with regard to main source of income of the household (Table 3.11). For 40.6 percent of the early adopters sericulture constitutes a main source of income while for late adopters it constitutes only a 13.7 percent. For the late adopters sericulture is more a subsidiary income as 61percent of them derive their income mainly from agriculture.

Table 3.11
Distribution of Early and Late Adopters by Main Source of Income

Source of Income	Early adopter		Late adopter		Total	
N.A.	1	(1.6)	2	(0.5)	3	(0.6)
Sericulture	26	(40.6)	58	(13.7)	84	(17.3)
Agriculture	27	(42.2)	257	(60.8)	284	(58.3)
Wages	5	(7.8)	34	(8.0)	39	(8.0)
Salary	3	(4.7)	27	(6.4)	30	(6.2)
Pension	1	(1.6)	14	(3.3)	15	(3.1)
Trade	1	(1.6)	5	(1.2)	6	(1.2)
Commerce	-	-	3	(0.7)	3	(0.6)
Other self empl.	-	-	14	(3.3)	14	(2.9)
Others	-	-	9	(2.1)	9	(1.8)
Total	64	100	423	100	487	100

Note : Figures in parantesis are percentage to column total.
Source: Census Of Sericulturists In Palakkad District
*Share Of Early and Late Adopters In the total

But for the size of land holding and main source of income there is not much distinction between socio-cultural characateristics of early and late adopters. Surprisingly, late adopters have a slight edge in the level of education (Table 3.12)

Table 3.12
Distribution of Early and Late Adopters by Education of The Head of The Family

Level Of Education	Early Adopters		Late Adopters		Total
lliterate	13	(20.3)	53	(12.5)	66
1 - 4	9	(14.1)	66	(15.6)	75
5 - 7	16	(25.0)	67	(15.8)	83
9 - 10	9	(14.1)	123	(29.1)	132
Matriculate	9	(14.1)	56	(13.2)	65
Degree	2	(3.1)	18	(14.3)	20
Masters	-	-	4	(0.9)	4
Technical	-	-	14	(3.3)	14
Professional	2	(3.1)	6	(1.4)	8
Others	4	(6.3)	16	(3.8)	20
Total	64	100	423	100	487

Note : Figures in parantesis are percentage to column total.
Source: Census Of Sericulturists In Palakkad District

Perhaps the relatively smaller size of holdings of early entrants would account for the higher prevalence of sericulture as the main source of income among the early entrants. A weak tendency also can be seen towards mulberry as monocrop in the paddy lands.

SECTION III

Rate Of Adoption And Adopter Characteristics

In this section we are trying to see how far the adopter characteristics mentioned in the above sections, have influenced the rate of adoption. The earlier studies on the rate of diffusion have pointed out a positive correlation between many of the adopter characteristics and rate of adoption. Those with higher level of adoption are hypothesized to be from larger land holdings, higher level of education, higher level of income etc. The rate of

adoption has already been defined as the proportion of land allotted to mulberry cultivation i.e. the total land holding. Of the total 2339 areas owned by the sericulture farmers in Palakkad mulberry is grown in 619 acres. But when standardised for differences in the quality of land, it turned out to be 499 acres. Rate of adoption has been calculated on the basis of this standardised acreage under mulberry. It may be cautioned that the standardisation procedure tends to depress the ratio of adoption.

However it can be seen from Table 3.13 that eventhough the adoption rate declines with size classes the average area tends to rise with size classes. The latter rises from around .36 cents for adopters with less than half an acre of land to .85 cents for adopters with 2.50 or more acres of land. Finally as can be expected the rate of adoption is the highest among those who have sericulture as the main source of income. Rate of adoption is relatively lowest for those who have agriculture as the main source. Sericulture is clearly a secondary source of income.

Table 3.13
Distribution Of farmers Across Land Holdings by Adoption Rate

Area	Adoption Rate 0-25	25.1-50	50.1-75	75.1-100	Total	Average Area Under Mulberry	Holding
Less than .50	3(13.0) (1.2)	5(21.7) (3.9)	1(4.3) (2.3)	14(60.9) (20.3)	23 (4.7)	.36	.44
.51 - 100	7(16.3) (2.8)	12(27.9) (9.4)	4(9.3) (9.3)	20(46.5) (29.0)	43 (8.8)	.71	.93
1.01 - 2.50	52(34.4) (21.0)	44(29.1) (34.6)	32(21.2) (74.4)	23(16.2) (33.3)	151 (31.0)	.85	1.85
2.51 - 5.00	92(59.0) (37.1)	50(32.1) (39.4)	5(3.2) (11.6)	9(5.8) (13.0)	156 (32.0)	.99	3.79
Above 50 acres	94(82.5) (37.9)	16(14.0) (12.6)	1(.9) (2.3)	3(2.6) (4.3)	114 (23.4)	1.39	10.08
Total	248 (50.9)	127 (26.1)	43 (8.8)	69 (14.2)	487 (100)	1.20	4.80

Table 3.14

Adoption rate by main source

Main Source	Adoption Rate <.5	5.1-50	50.1-75	75.1-100	Total
1. Sericulture	23(27.4) (9.3)	24(28.6) (18.9)	11(13.1) (25.6)	26(31.0) (37.7)	84(100) (17.2)
2. Agriculture	174(60.9) (70.2)	75(26.4) (59.1)	21(7.4) (48.8)	15(5.3) (21.7)	284(100) (58.3)
3. Wage Labourer	8(20.5) (3.2)	11(28.2) (8.7)	5(12.8) (11.6)	15(38.5) (21.7)	39(100) (8.0)
4. Salary	12(40.0) (4.8)	8(26.7) (6.3)	2(6.7) (4.3)	8(26.7) (11.6)	30(100) (6.2)
5. Pension	12(80.0) (4.8)	1(6.7) (0.8)	1(6.7) (2.3)	1(6.7) (1.4)	15(100) (3.1)
6. Trade	3(50.0) (1.2)	2(33.3) (1.6)	1(16.7) (2.3)	-	6(100) (1.2)
7. Commerce	1(33.3) (0.4)	1(33.3) (0.8)	-	1(33.3) (1.4)	3(100) (0.6)
8. Self employed	8(57.1) (3.2)	4(28.6) (3.1)	1(7.1) (2.3)	1(7.1) (1.4)	14(100) (2.9)
9. Others	6(66.7) (2.4)	1(11.1) (0.8)	1(11.1) (2.3)	1(11.1) (1.4)	9(100) (1.8)
10.N.A	1	-	2	-	3
11. Total	248(50.9)	127(26.1)	43(8.8)	69(14.2)	487

To conclude, the sericulturists are being drawn from all land size categories of farmers. In Palakkad district the medium size farmers dominate. However, in the state as a whole small and marginal farmers do constitute more significant proportion. For a majority of the adopters agriculture is the main source of income. Only for 17 percent of the adopter sericulture constitutes the main source of income. The major difference between early and late adopters is

in size of land holdings. The average size of land holding of the adopters have tended to rise our time.

End Notes

1. The Distribution of Households by Land Holdings (Area in Hectares)

Sl.	Area	No. of Households	Area under Ownership holdings	No. of households
1.	0	4521	12.42	
2.	0.002	126	0.35	
3.	.21-.40	17559	48.23	1234
4.	.41-.50	5558	15.27	1523
5.	.51-1.00	1759	4.83	783
6.	1.01-2.02	3488	9.58	2476
7.	2.03-3.03	2211	6.07	3092
8.	3.04-4.04	608	1.67	1450
9.	4.05-5.05	309	0.85	1065
10.	5.06-6.07	140	0.38	620
11.	6.08-8.09	50	0.14	264
12.	8.10-10.12	63	0.17	438
13.	10.13-12.14		0.00	
14.	12.15-20.34	6	0.02	65
15.	>20.25	10	0.03	144
		36408	100.00	13154

Source: Sarvekshana (1987), Vol.XI, No.2, Issue No. 33.

CHAPTER IV

COST AND RETURNS FROM SERICULTURE

A crucial determinant of the acceptance of an innovation is the direct benefit that accrues to the adopters. Sericulture is considered to be highly a beneficial venture in terms of (a)the direct profits on investment and (b)returns to the family labour. In the case of Kerala, it has been held out as an ideal inter crop to be grown in the coconut plantations involving relatively little crop shift. Another reason for the emphasis given for sericulture, as we have already noted, is its high family and female labour intensiveness. This aspect assumes particular significance in the background of low participation and high unemployment among women in Kerala. According to the official sericulture programme projections, the net benefit after debt service has been claimed to be Rs.14320.00 per acre (Government Of Kerala 1989). This is an astoundingly high level of returns and has been hailed as a harbinger of quantum jump in the returns from coconut lands in Kerala. But how much of this potential is being realized is an open question. Primarily with this issue in mind a sample survey had been conducted in the two panchayaths of Agali and Kuthanoor. The establishment charges, cost of cultivation and rearing and returns were collected from 59 farmers.

In Section I of this chapter we are presenting an analysis of cost of cultivation based upon the above data. Returns to sericulture are found to be seen to be much lower than the expectations. The main factor for this unexpected outcome will be shown to be the low capacity utilization by the sericulture

farmers. This issue is taken up in Section II. Finally in Section III the extent of female and family employment has been carried out.

SECTION I

Cost and Returns From Sericulture:

In Table 4.1 the cost of establishment charges for an acre of mulberry plantation is presented. For purpose of comparison the projections of Government Of Kerala, Planning Board are also given. While the latter refers to the year 1989 our cost data are based on the reported expenditure incurred by the 59 sample farmers between 1988-1992. The total expenditure on human labour, animal and machine hiring charges for land preparations and planting in both the estimates comes to nearly equal, with our estimates being slightly on the higher side. The actual expenditure in Palakkad district works out to be Rs. 3493.23 while the projected estimate is Rs.3150. While the project estimate assumes a wage rate of Rs.25 per person day, the average wage paid by our sample sericulturists works out to be Rs.34.89 for male and 18.75 for female. The total Labour input in land preparation and planting in the two panchayats on Palakkad district together is 56.83 women days and 73.53 persondays per acre. In contrast official estimate allowed only for 92 person days for land preparation and planting of mulberry. The reason for the higher labour input was that most of the land preparation was done manually using spade. The cost of animal and machine labour actually incurred is only one fifth of the estimate of the Planning Board. Both in our estimate and

Official project estimate land value has not been taken into consideration.

The major difference in the cost of establishment arises from the material cost. Both the expenditure on manure and fertilizer was lower than what was expected by the official estimate .Fixed cost of Rs.25000.00 for pumpset is allowed for in the official estimate while we have given allowance for Rs.1990.00 only. Only 30.5 percent of the sample farmers had pumpsets and all of them were reported to have owned pumpset even before mulberry cultivation. The cost of the pumpset was allotted to mulberry cultivation on the basis of the proportion of area under mulberry to the total area under cultivation.

Table 4.1

Establishment Cost Of One Acre of Mulberry Garden

(amount in Rs)

Item	paidout wages per acre male	imputed wages per acre male	paidout wages per acre female	imputed wages peracre female	Total Labour Cost	Project Estimate
(A) Labour Cost						
1 Preparation of land	369.93	90.58	36.53	28.45	525.49	
2 Deep digging	189.25	40.71	52.92	7.78	290.66	
3 Levelling	85.90	23.50	45.30	6.18	160.88	
4 Pit making	245.94	52.19	60.37	11.48	369.98	75
5 Ridge	289.84	70.08	128.70	12.13	500.75	1000
6 Preparation of the planting material	35.65	48.92	33.15	20.10	137.82	
7 Planting	113.73	60.66	76.94	21.36	272.70	
8 Manuring	96.08	33.48	63.59	13.27	206.42	125
9 Fertilizer	117.35	45.79	59.50	11.44	234.09	
10 Intercultivation	68.66	69.74	187.92	31.93	458.25	750
11 Irrigation	11.51	76.09	11.57	34.71	133.87	250
12 Total	1723.84	611.75	756.49	198.84	3280.93	
Animal					173.00	100
Deep Ploughing(t)					40.23	600
Disk Harrowing						250
(A)Sub Total					3493.23	3150
(B) Material Cost						
1 Farm Yard Manure					750.00	1000
2 Planting Material					286.46	550
3 Fertiliser					496.52	399
4 Miscellaneous					80.75	200
5 Pumpset					1990.89	25000
(B)Sub Total					3604.62	27149
Total(A+B)					7097.85	30299

Source: Sample Survey of the Sericuturists 1993, Government of Kerala (1989)

Table 4.2 gives the cost of silk worm rearing establishment. It consists of two components ,rearing house and rearing

equipments. Both the official projections and the actual establishment charges incurred by the farmers in Palakkad shows a surprising coincidence around Rs.7900.

Table 4.2
The Cost Of Establishment In Silkworm Rearing

(amount in Rs)

Item	Survey Results	Project estimate by Planning Board
(A)Rearing House	13375	12000
(B)Rearing Equipments		
1.rearing stand	888.76	2400
2.rearing trays	1426.14	1200
3.Leaf Chamber	62.30	300.00
4.bed cleaning net	441.83	480.00
5.ant wells	86.32	160
6.foam pad	50.49	90
7.miscellaneous	37.11	120
8.cocoon mountages	4901.26	3150
Sub total	7894.218	7900

Source: Same as for Table 4.1

The annual maintenance charges of an acre of mulberry land are given in Table 4.3. Our sample includes both irrigated and rainfed as well as mono and multiple crop lands. They have been standardized on the basis of norms given in Chapter III viz. one acre of irrigated mulberry is equivalent to two acres of unirrigated mulberry monocrop, two acres of irrigated mixed crop or four acres of unirrigated mulberry mixed crop. For annual land tilling, weeding, manuring a total of 57.73 person days per acre was seen to be applied in Palakkad which is close to the official projections (56). The higher cost of annual maintenance is largely explained by relatively higher wages paid by our sample farmers.

But it is also seen that material cost for fertilizer is much lower than the official estimate.

Table 4.3

Maintenance Expenses of Mulberry Garden

(amount in Rs)

Sl.No.	Item	Paid out cost of Hired labour		Imputed Value of Family labour			
		Male	Female	Male	Female		
Labour Cost							
1.	Land Tilling & Harrowing	112.18	72.68	33.89	46.28	265.03	400
2.	Weeding & Intercultural	86.76	57.49	46.09	60.75	251.09	
3.	Application of Fertilizers	113.87	57.13	70.49	89.68	331.17	800
4.	Irrigation	168.09	181.52	76.93	6.33	432.87	300
5.	Pruning	11.86	12.84	59.65	43.57	127.92	300
	Sub Total	492.76	381.66	287.05	246.61	1408.08	1800
Material Cost							
1.	FYM					750	1000
2.	Fertilizers					496.52	1331
3.	Others						
	Sub Total					1246.52	2331

Source:same as for Table 4.1

The labour inputs for rearing as revealed by our survey 31.48 person day is relatively lower than the official estimate of 37.5 person day. The main difference was in the labour utilized for leaf harvesting. While only 2.37 person days per 100 dfls were utilized for leaf harvesting according to Planning Board project estimate 15 person days per 100 dfls to be employed for this job. With out further field level enquiry , reasons for the understatement of this item in our survey cannot be pinpointed.

Table 4.4
Expenditure Incurred on Rearing

(amount in Rs)

Item	Value of Family labour	Imputed	Paid out cost Hired labour		Total	Project Estimate
a.Labour Cost for rearing 100 Dfls						
1.Cleaning and Disinfection	16.04	9.85	5.82	5.55	37.25	25.00
2.YoungSilkwormrearing	100.17	53.61	23.25	21.06	198.09	150.00
3.Adult rearing	124.11	70.40	78.34	107.06	379.91	300.00
4.Mounting and harve	44.10	26.12	16.63	35.64	122.50	75.00
5.Leaf Harvesting	47.31	24.88	21.35	23.90	117.43	375.00
6.Marketing					149.00	100.00
Sub total	331.73	184.86	145.39	193.21	1004.18	1025.00
a.Labour Cost(per acre)						
1.Cleaning and Disinfection	27.74	17.05	10.06	9.60	64.45	200.00
2.YoungSilkwormrearing	173.29	92.75	40.22	36.44	342.69	1200.00
3.Adult rearing	214.71	121.80	135.53	185.21	657.24	2400.00
4.Mounting and harve	76.29	45.19	28.77	61.67	211.92	600.00
5.Leaf Harvesting	81.84	43.04	36.94	41.34	203.16	3000.00
6.Marketing					149.00	400.00
Total wages	573.87	319.83	251.52	334.26		
Sub Total					1628.50	7800.00

Source:same as for Table 4.1

The actual wage rates paid for rearing, as in the case of mulberry cultivation are relatively higher than the official rate of Rs.25. For male labourers the wages were Rs.36.46 and for female labourers Rs.21 in 1992. It may also be stated that we came across significant differences in the wages paid by the farmers in the same area particularly those who employ Tamil labourers and those who do not. The labour charges incurred by the former were relatively lower.

Even though the labour costs incurred for 100 Dfls do not reveal any substantial difference between official project estimate and our estimate on Palakkad district, there is a wide difference

in the labour cost incurred for an acre. The estimate of Rs 1628 in our sample, is 75 percent lower than the official project estimate. The difference is explained by the fact that while official estimate has assumed 800 Dfls per acre to be brushed in a year, in our sample only 173 are being brushed. This difference in the capacity utilization, as we shall see later, has a determining influence on the outcome of sericulture venture in Palakkad. With respect to material cost the expenditure incurred by the sample farmers is relatively lower for the same reason.

Table 4.5
Material Cost of Rearing Per Acre

(amount in Rs)

Sl.No.	Items	Actual Expenditure incurred by the sample farmers	Projections by the State Planning Board
1.	Formalin	50.17	24.00
2.	Silkworm eggs	389.25	400.00
3.	Parafine paper	12.92	120.00
4.	Fuel/elec	14.64	84.00
5.	Miscellaneous	8.13	800.00
	Total	475.11	1428.00

Source: same as for Table 4.1.

The total establishment charges, annual maintenance expenditure and the income and profit from sericulture is summarized in Table 4.6.

The contrast between official estimation and actual field experience could not have been more dramatic . The actual excess of current income over current expenditure is a meagre Rs.635.59 per acre for farmers in Palakkad against official expectation of Rs.18584. If one takes into account returns and depreciation of

the fixed cost the sericulture farming in Palakkad would sink into negative balance.

Table 4.6

Cost and Returns from Sericulture

(amount in rupees)

	Survey	Project estimate
A. Establishment Costs		
1. Mulberry plantation	7097.85	30299.0
2. Rearing house	13375.00	12000.0
3. Rearing equipments	7894.21	7900.0
B. Income		
1. Revenue realized from the sale of cocoons	5227.83	31500.0
urinated/defective cocoons	165.47	
Total income	5393.30	
C. Expenditure		
1. Mulberry cultivation		
(a) Labour wages	1408.08	1800
(b) FYM and fertilisers	1246.52	2331
2. Silk worm rearing wages	1628.00	7800
3. Rearing material	475.11	1486
Total expenditure	4757.71	13417
D. In Benefit (b-c)	635.59	18584
If equated instalment for the fixed cost is added at the rate of 13% (market rate of interest) Net loss/profit=	-3753.41	12184

Note : Capacity Utilisation in sample panchayaths 21.23 percent.

Source:same as for Table 4.1.

On the assumption of 15 years of life for mulberry plant and rearing house, the equated instalment for the fixed cost at 13 percent market rate of interest the annuity would work out to be Rs.4389. Result would be a net loss of Rs.3753.41 for mulberry cultivation in Palakkad in 1992. On the other hand even if the same norms of annuitisation is adopted for the official estimate of

same norms of annuitisation is adopted for the official estimate of fixed investment of Rs. 50199 which is 75 percent higher than our figure. The farmers should still have made a net profit of Rs.12184 per acre. Even if one gives allowances for under reporting of returns by farmers in our survey the difference is too large to be wished away.

The crucial difference evidently being the revenue realized from an acre of mulberry cultivation. The revenue that farmers in Palakkad received from an acre of mulberry in 1992 turns out to be Rs.5393.30 as against the official expectation of Rs.31500. The price realized by the farmers in Palakkad was Rs.100.40 per kg against the rate of Rs.75 per kg used in the official estimate. The higher price realization is partly due to the seed cocoons raised by some of the farmers in our sample. Therefore the crucial variable that would explain the low return boils down to the productivity of cocoons per acre, an issue we shall address to in the next section.

SECTION II

Productivity of Mulberry cultivation:

The productivity per 100 dfls according to our sample survey was 30.1 which in fact was slightly lower than the census estimate for Palakkad 35.58 Kg. A productivity of 45 Kg was the production target of the Government, while the achievement was, 90 percent of the target, which is a promising performance as far as a non-traditional state is concerned.

Productivity of silk wormseed by the land size class is given Table 4.8. Productivity is the highest in multivoltine which is mostly grown for seed purposes. Cross breed productivity is around 38 Kg per 100 dfls while that of bivoltine is 30Kg. There is no systematic relationship between productivity and land size class. The fluctuation in the average monthly productivity shows the least variability is in cross breed variety the most popular race in Palakkad.[1]

The productivity per 100 dfls is satisfactory. But the performance per acre of mulberry leaves much to be desired. It is far below the targeted level. Achievement is to the tune of 146.52 Kg and 44.30Kg for irrigated and rainfed mulberry respectively. (Table 4.7). The comparatively low per acre productivity and not too low a productivity per 100 dfls is a pointer either to the low mulberry leaf yield or the under utilization of the capacity.

Table 4.7

Productivity of Sericulture in Palakkad

Description (1)	Achievement (2)	Target (3)
Per 100 Dfls	36 kg	greater than 40 kg
per acre of irrigated mulberry	146.51	320 kg
Per acre of un-irrigated mulberry	44.30	160 kg

Source: Column 2 : Census of sericulturists
Column 3 : Government of Kerala(1989)

It has not been possible to estimate the mulberry leaf yield. But going by visual impression gathered during our field enquiries, the growth of mulberry plant is generally satisfactory in Palakkad.

Inadequate irrigation and fertilizer input prevent the full utilization of the potential and there is much scope for improvement. But the case of the strange phenomenon of extremely low productivity per acre in Palakkad in 1992 cannot be explained by the low leaf yield. It is mainly the result of the insufficient utilization of the green leaves. In an year a maximum of six brushings can be done (Government of Kerala 1989). But in 1992 only 77 farmers had reported 6 brushings in 1992. Total number of brushings was only 40 percent of the potential in Palakkad district.

Table 4.8

Productivity per 100 Dfls across land size classes

Land Size classes in acres	Type of Seeds											
	Multivoltine			Bivoltine			Crossbred			Others		
	No.	Output (in kgs)	Productivity	No.	Output (in kgs)	Productivity	No.	Output (in kgs)	Productivity	No.	Output (in kgs)	Productivity
< 1.00	2125	963.83	45.36	9418	2533.2	26.90	21973	8498.0	38.67	758	150.6	19.86
1.01 - 2.50	1010	383.87	30.01	5350	1891.0	33.29	14798	5441.97	36.78	504	123.1	24.42
> 2.51	35	19.23	54.94	2882	1041.5	36.14	2302	886.92	37.66	-	-	-
Total	3170	1366.93	43.12	17650	5355.7	30.34	39073	14806.89	37.90	1262	273.6	21.68

Source: same as for Table 4.1.

The number of dfls brushed per acre are significantly lower than that was possible given the acreage under mulberry.It is expected that under irrigated conditions 800 dfls per acre and not less than 400 dfls per acre under rainfed conditions can be brushed. Therefore in the district of Palakkad around 3,99,056 Dfls can be brushed given an area of 499.82 acres under mulberry cultivation. Inspite of this only 64,621 Dfls had been brushed during 1992. Only 16.19 percent of the capacity has been utilized.

This extremely low level of utilization is surprising. But the low ratio is also conformed by the Census of Sericulturists also.

It has not been possible to pinpoint the reasons for the low levels of capacity utilization. Two possible hypotheses can be put forward. (a) With a significant proportion of farmers being new entrants, production has not been in full swing and the low utilization represents the initial teething problem which may be overcome in due course of time . This can be seen from Table 4.9. The average number of Dfls brushed per acre is inversely related to the year of entry into sericulture. But it is surprising that even those who had entered the industry before 1988, the capacity utilization is only 28 percent. (b) As we shall see later the 1992 was an year of fall in prices. It might have acted as the serious disincentive to the farmer to utilize their capacity.

Table 4.9

Capacity Utilization By the Year Of Entry

Year Of entry	Average no of Dfls	Average Area	Capacity Utilization
Before 1988	8724	39.12	27.88
1988	9400	49.38	23.80
1989	15577	115.49	16.86
1990	15954	110.84	17.99
1991	12732	111.64	14.26
1992	2234	72.35	3.86
Total	64621	498.82	16.19

Source: Census of Sericlturists in Palakkad 1992

We have standardized the acreage under mulberry on the basis of certain assumptions that has already been explained. Due to

certain problems of data it has not been possible to cross check the validity of the assumption involved in the above process with the actual number of mulberry trees per acre of different qualities of land. There could have been an element of over estimation of the capacity as a result of the assumptions used in the standardisation of the acreage. But the estimate of utilization of capacity is too low to be significantly affected by any possible adjustments in acreage taking into account the number of trees.

SECTION III

Self Employment Potential in Sericulture:

Even if the direct profit from sericulture is meagre, it has been argued that, there would still be incentive for adoption, given the self-employment potential of the industry. In the cost calculation in Section I the wages of the family labour have been imputed at market prices. Though only a quarter of the labour charges of initial establishment cost was seen to be family labour. The family labour contribution rises to around 45 percent in the annual maintenance cost. In silkworm rearing the paidout labour cost 35.97 percent of the total labour charges.

Tables 4.10, 4.11, and 4.12 present the persondays by gender and hired / selfemployed status in each of the labour activity in establishment and annual maintenance of one acre of mulberry garden and 100 Dfls of silk worm seeds.

Table 4.10

Employment Generation And Labour Composition

In Mulberry Cultivation

Item	No.of Mandays Family labour per ac. Male	Per acr female	Hired labour per acr male	per acr female	Total Family Labour	Total Hired Labour	Ratio of Hired to Family labour Male	Female	Total	Ratio of Female To Male Family labour	Hired labour
1 Preparation of land	2.70	1.52	10.60	2.02	4.21	12.62	3.93	1.33	3.00	0.56	0.19
2 Deep digging	1.21	0.41	5.76	2.83	1.63	8.59	4.75	6.83	5.28	0.34	0.49
3 Levelling	0.70	0.33	2.72	2.38	1.03	5.09	3.88	7.22	4.95	0.47	0.88
4 Pit making	1.55	0.61	7.31	3.19	2.17	10.50	4.70	5.21	4.85	0.39	0.44
5 Ridge	2.09	0.65	9.22	7.18	2.73	16.40	4.42	11.10	6.00	0.31	0.78
6 Preparation of the planting material	1.46	1.07	1.01	1.74	2.53	2.75	0.69	1.62	1.09	0.74	1.73
7 Planting	1.81	1.14	3.31	4.02	2.95	7.32	1.83	3.52	2.49	0.63	1.21
8 Manuering	1.00	0.71	2.56	3.18	1.70	5.74	2.57	4.49	3.37	0.71	1.24
9 Fertilizer	1.36	0.61	3.36	3.16	1.97	6.52	2.46	5.18	3.30	0.45	0.94
10 intercultural	2.08	1.70	4.96	10.04	3.78	15.00	2.39	5.90	3.97	0.82	2.02
11 Irrigation	2.27	1.85	0.35	0.71	4.12	1.06	0.15	0.38	0.26	0.82	2.06
12 Others	1.76	1.29	2.41	4.49	3.05	6.89	1.37	3.47	2.26	0.74	1.87
Total	19.98	11.90	53.55	44.94	31.87	98.49	2.68	3.78	3.09	0.60	0.84

In the initial establishment of mulberry garden male labourers outnumber female labourers. Of the total 130.36 person days required 56 percent are undertaken by males. Activities like ploughing, pit making, and ridge making are predominantly male activities. In contrast to the total of 57.73 person days employed for annual maintenance of the garden only 40 percent are accounted for by male labourers. Similarly of the 31.58 days of labour requirement for silk worm rearing (100 Dfls) male contribution is only 42 percent.

Table 4.11

Employment Generation And Labour Composition

In Silk Work Rearing

	Item	No.of Mandays per 100 Dfls Family labour male	female	Hired labour male	female	Total Family Labour	Total Hired Labour	Ratio of Hired to Family labour Male	Female	Total	Ratio of Female To Male Family labour	Hired labour	Total
1	Cleaning & Disinfectants	0.44	0.46	0.16	0.26	0.90	0.42	0.36	0.56	0.46	1.04	1.61	1.19
2	Early stage	2.75	2.48	0.64	0.98	5.23	1.61	0.23	0.39	0.31	0.90	1.53	1.02
3	Late stage	3.40	3.26	2.15	4.96	6.66	7.11	0.63	1.52	1.07	0.96	2.31	1.48
4	Plucking	1.30	1.15	0.59	1.11	2.45	1.69	0.45	0.96	0.69	0.89	1.89	1.20
5	Mounting	0.49	0.47	0.23	0.98	0.96	1.21	0.47	2.08	1.26	0.95	4.22	2.00
6	Harvesting	0.72	0.74	0.23	0.68	1.46	0.90	0.31	0.91	0.62	1.03	3.00	1.50
7	Classifying	0.30	0.27	0.07	0.33	0.57	0.40	0.23	1.20	0.69			
	Total	9.40	8.84	4.06	9.28	18.24	13.34	0.43	1.05	0.73	0.94	2.29	1.35

Source: same as for Table 4.1

More important for our analysis in this section is the incidence of family labour. The mulberry cultivation is a predominantly hired labour activity. Family labour contributes only 25 percent of the persondays of employment required for the establishment of mulberry garden and 38 percent of the person days of employment required for annual maintenance. In silk worm rearing family labour seems to have an edge. It accounts for 58 percent of the person days of employment.

The higher incidence of hired labourers and consequent large paid out costs tend to undermine the possible earnings from self employment.

Table 4.12
Employment Generated In the
Maintenance of Mulberry Garden

Item	Family Labour		Hired labour	
	male	Female	male	Female
Manuering	1.00	2.56	3.31	4.02
Fertilizer	1.36	3.36	2.56	3.18
Weeding	2.08	4.96	3.36	3.16
Irrigation	2.27	0.35	4.96	10.04
Pruning	1.76	2.41	0.35	0.71
Total	8.46	13.63	14.53	21.11

To sum up, the returns to sericulture in Palakkad had in our survey year was negative, the main reason being under utilization of the capacity. Unless higher utilization is ensured sericulture cannot be made an attractive proposition to the farmers.

Note

1. Productivity Of Cocoon Seeds In Palakkad District

SL	Month	Type of Seeds											
		Multivoltine			Bivoltine			Crossbreed			Others		
		Number DFLs	Yield	Productivity	Number DFLs	Yield	Productivity	Number DFLs	Yield	Productivity	Number DFLs	Yield	Productivity
1	January	366.00	120.83	33.01	1096	434.15	39.61	4321	1772.8	41.03	50	16.92	33.84
2	February	500	107.5	21.50	1048	400.55	38.22	2378	1001.8	42.13	236	41.93	17.77
3	March	206	105.84	51.38	1856	657.64	35.43	4199	1675.5	39.90	300	48.08	16.03
4	April	240	130	54.17	1011	324.81	32.13	2554	1067.9	41.81	80	21.54	26.93
5	May	50	25	50.00	2251	871.83	38.73	3277	1396.5	42.62	215	15	6.98
6	June	395.00	115.83	29.32	1035	334.18	32.29	2801	1156.1	41.28	90	11.54	12.82
7	July	215	98.33	45.73	1223	378.43	30.94	2776	1317.7	47.47	115	7.31	6.36
8	August	464	176.67	38.08	2192	591.57	26.99	3165	1363	43.06	110	38.46	34.96
9	Septemb	350	165.83	47.38	1863	472.93	25.39	2160	884.24	40.94	65	32.31	49.71
10	October	462	144.17	31.21	2113	714.74	33.83	2557	1017.2	39.78	85	29.23	34.39
11	Novembe	78	40.83	52.35	675	209.64	31.06	2368	1037.7	43.82	55	6.15	11.18
12	Deceber	601	249.98	41.59	1552	331.18	21.34	5630	1934.8	34.37	38	5.15	13.55
	Total	3927	1480.8	37.71	17915	5721.7	31.94	38186	15625	40.92	1439	273.62	19.01
	std			10.16			5.33			2.92			13.07
	avg			41.31			32.16			41.52			22.04
	c.v			24.59			16.58			7.03			59.30

CHAPTER V

KEY PROBLEMS - PERCEPTIONS OF THE ADOPTERS

The perceptions of farmers on the major problems related to mulberry cultivation and cocoon rearing were gathered during the surveys. In this chapter this information has been used to identify the major issues facing sericulturists in Kerala and then go on to discuss the various dimensions of the problems so identified with the help of relevant complementary primary and secondary data available.

As can be seen in Table 5.1 169 farmers i.e. around 35 percent of the adopters reported serious problems in the initial stages of the adoption of cultivation. The most important problem at this stage seems to be financial in nature. The next importance being technical problems and lack of appropriate equipments. However once the production was initiated the major problem shifts from finance to market(see Table 5.2). More than 83 percent of the adopters reported having marketing problems and around 71 percent reported it as the most important problem faced by them. Financial problems continue to be prominent, with half the respondents ranking it either the most important or as the second important problem faced by them. The increase in fertilizer prices seems to be an important problem agitating the farmers. Technical factors and low quality seeds received only relatively low rank orderings. In the sections that follow these issues are taken up in detail.

Finally in the last section, we shall also examine the reasons for some of the adopters abandoning sericulture. As already seen 110 of the adopters constituting 22.6 percent of the total had

abandoned sericulture for some reason or the other. A discussion of their characteristics would give important insights into the constraints facing sericulturists in Palakkad.

Table 5.1

The Nature Of The Problems Faced At The Initial Stages of production

Sl. No.	Nature of the problem	Land Size Classes 0-.5	.51-1.00	1.01-2.00	2.51-5.0	Above 5.00	Total
1.	Financial difficulties	2 (2.8)	3 (4.2)	26 (36.6)	25 (35.2)	15 ((21.1)	71 (100)
2.	Technical	2 (7.1)	1 (3.57)	6 (21.4)	12 (42.9)	7 (25)	28 (100)
3.	Lack of equipments	-	2 (8.0)	8 (32.0)	8 (32.0)	7 (28.0)	25 (100)
4.	Lack of irrigation facility	-	-	4 (44.4)	3 (33.3)	2 (22.2)	9 (100)
5.	Lack of enough leaves to start rearing			2 (66.7)	-	1 (33.3)	3 (100)
6.	Adverse climate		2 (14.3)	6 (42.9)	1 (7.1)	5 (35.7)	14 (100)
7.	Incidental			2 (28.6)	3 (42.9)	2 (28.6)	7 (100)
8.	Others			5 (50.0)	3 (30.0)	4 (40.0)	10 (100)
	Total	4	8	59	55	43	169

Note : Figures in parentheses shows percentages to row total
Source: Census Of Sericulturists In Palakkad.

Table 5.2

Problems related to Sericulture

Sl.No.	Nature of the Problem	Ranking of the problems 1	2	3	4	5	6	7	Total
1.	Marketing	348	35	14	5	2	1	2	407
2.	Financial	49	164	38	17	10	11	-	289
3.	Technical	3	35	53	29	24	12	-	156
4.	Fertilizer price increase	11	89	99	50	10	5	-	264
5.	Lack of good quality eggs	1	21	42	40	26	15	-	146
6.	Climatic	7	39	57	53	36	24	1	218
7.	Others	4	9	5	9	9	8	2	49

Source: Same as Table 5.1

Marketing Problems

The cocoon market has been characterized by high levels of price instability. It has not been possible to undertake an analysis the factors responsible for this phenomenon as there is very little published secondary information on silk market structures or key variables like prices. Published data on the prices of cocoons available for major centers of India, annually for the 1980s had been used to analyze the trend in prices. (See Table 5.3) On the whole it can be said that prices in the important markets spread across India have tended to move together, but for the exception of Coimbatore and Bhubaneswar. There is significant correlation between the average prices of different markets.

On the whole the prices of cocoons have been rising at around 12 percent per annum. In Coimbatore average prices have tended to increase by less than 2 percent while in Bhubaneswar they have

actually declined. There is considerable year to year fluctuations in the prices and the years 1983, 1986, and 1990 register significant decline in the prices.

Despite the various measures such as regulated marketing and active Government intervention with minimum support price the range of the minimum and maximum prices in Tamil Nadu have tended to increase overtime.(See Anonymous 1984 and see ReghuKumar 1988). Data in Table 5.4 indicates that the experience of Tamil Nadu is not an exception. However, it may also be remembered that caution must be exercised in interpreting the trend of price ranges given in Table 5.4. Even a single sale of poor quality silk at very low price would tend to increase the range considerably and silk is a commodity which is highly income elastic. There could also be problems of the reporting system as it has been remarked that the possibility of increased speculative activity in recent years should be considered as an important factor in explaining the fluctuations in prices (Sanjay Sinha, 1989).

Table 5.3

Difference between the Maximum And Minimum Prices of

Cocoons In The Various Market

Year	Ramanagaram	Sidhlaghatta	T.Narsipur	Malda	Madanappilly	Hindupur	Coimbator	Vaniyambadi	Bhubaneshwar
1980	11.40	17.21	6.80	1.00	-				
1981	22.00	37.30	17.10	1.75					
1982	21.65	38.00	12.40	2.50					
1983	21.30	31.85	11.75	2.50	22.75	21.65	23.25	26.70	10.00
1984	24.45	29.90	13.25	5.00	12.95	15.25	33.55	34.90	1.00
1985	29.15	28.25	12.10	15.00	12.50	19.65	35.35	45.45	10.00
1986	32.65	25.20	11.10	8.15	16.05	23.10	38.80	35.40	5.00
1987	39.80	19.95	16.00	7.90	21.50	29.30	46.50	38.95	5.00
1988	41.70	66.15	37.15	20.00	56.35	66.05	69.65	82.80	10.00
1989	65.20	65.85	42.05	20.00	54.85	71.20	83.00	86.55	5.00
1990	78.50	60.85	41.15	23.00	66.60	80.05	83.20	71.60	20.00

Source: Silk in India, 1992.

Table 5.4

The Coefficient of Variation in the

Prices of different states

State	Market	Minimum price	Maximum price	Average price
Karnataka	Siddlagatta (improved)	29.78	41.56	37.39
	Ramanagaram (Bivoltine)	25.97	31.41	27.97
	T.Narsipur (ordinary)	27.97	23.95	39.08
West Bengal	Malda	32.74	45.56	39.92
Andhra Pradesh	Madanappalli (improved)	66.20	72.85	68.65
	Hindupur (improved)	63.29	74.15	68.61
Tamil Nadu	Coimbatore (improved)	153.65	74.47	79.06
	Vaniyambadi (improved)	85.18	79.74	80.71
Orissa	Bhubaneswar	71.77	64.88	67.27

Source: Same as Table 5.3

Table 5.5

Annual Percentage Change In The Prices of Cocoons in Various Markets

Year	Ramanagaram	Sidhla-ghatta	T.Narsi pur	Malda	Madana-ppilly	Hindupur	Coimb atore	Vaniya ambadi	Bhubane-
1980-1981	19.549	53.163	40.060	2.500					
1981-1982	15.802	6.030	2.366	2.439					
1982-1983	13.646	-22.800	1.576	-4.762					
1983-1984	6.631	17.304	7.446	83.333	25.940	15.119	-71.313	7.813	12.857
1984-1985	13.445	6.102	16.073	0.000	17.246	11.757	20.680	5.072	1.266
1985-1986	-1.975	2.959	-1.990	-1.364	-5.665	-3.973	-4.973	19.387	-6.250
1986-1987	19.295	21.529	22.504	15.576	19.449	19.114	18.411	17.266	0.000
1987-1988	8.024	29.630	31.975	27.592	20.618	38.601	40.735	74.275	33.333
1988-1989	35.887	-3.787	-1.884	12.500	19.809	1.024	15.778	19.001	5.000
1989-1990	3.740	3.005	-0.107	-3.333	-13.948	-5.136	-5.098	-26.735	-61.905
Average annual Percentage change	12.19	10.28	10.73	12.23	10.43	9.56	1.78	14.51	-1.96

Source: Silk in India 1992 (CSB)

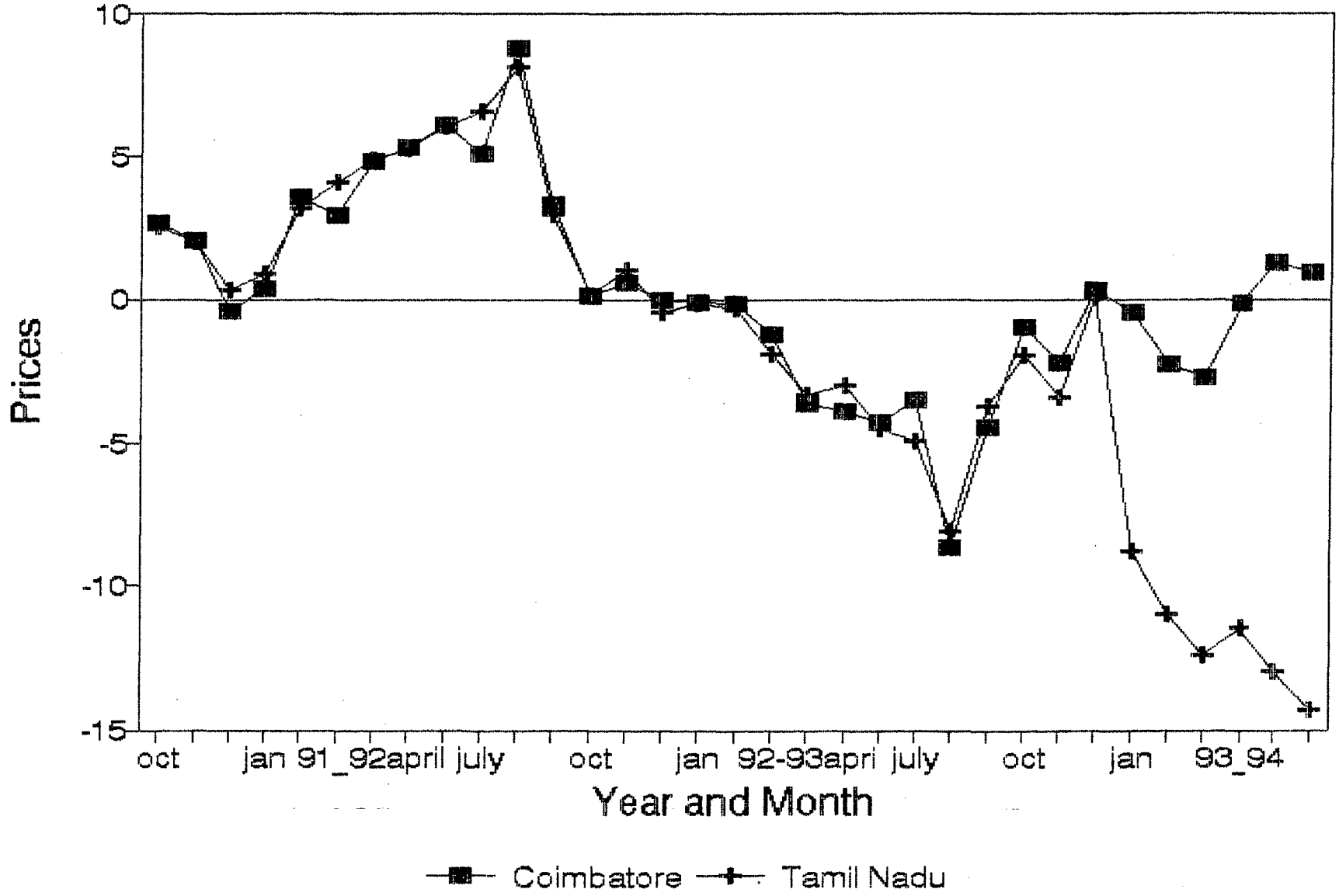
What is relevant to our analysis is the trend in the prices of Coimbatore and Vaniambadi markets. Coimbatore in Tamil Nadu near the Kerala border constitutes the major market for the sale of cocoon from the Palakkad market. This is because, there is neither sufficient reeling centers, nor local markets to absorb increased cocoon production in Kerala. The strategy of sericulture for the 8th Five Year Plan in Kerala had envisaged that silk reeling centers should be established in every district, initially in the public sector, Co-operative Cocoon Marketing Cum Reeling units and Cooperative Reeling Units. It was envisaged that the silk produced in the various reeling centers would be marketed through the government channels to textile industry within the state (State Planning board, 1989). Such visions of integrated development has remained as mirage. Currently only two reeling centers in the state

in Alleppey and Kasargod district have been established. There is also one reeling unit in the cooperative sector (Govt. of Kerala, 1992) There are a few private small scale reeling centers in Palakkad and also a Demonstration Cum Technical Training Centre for reeling and spinning by Central Silk Board is also functioning. But these facilities are far from adequate and most of the production has to be marketed in cocoon stage itself. But by and large a vast majority of the farmers have to depend upon external markets in Tamil Nadu.

The Panchayat level sericulture cooperative societies have not taken off even though 435 of them have been formally set up. Therefore, it is left to the individual farmer to market the product on their own. Not only is he handicapped by the alien market conditions but also the fact that he has to sell it at the cocoon stage which is easily perishable in nature. The Coimbatore market as we have seen earlier is the most volatile. The coefficient of variation is also seen to be the highest in Coimbatore than those of other centers. A CSB sponsored cocoon market has also started functioning from December 1991.The movement of monthly average prices of Coimbatore and other major markets of Tamil Nadu are plotted in the graph from October 1991 to June 1993. From June,to the last quarter of 1992 it is seen that prices had been declining. Even when the Coimbatore prices have stabilized recently the average price in Tamil Nadu has registered a significant fall. The average price of cocoon which stood at Rs.181.8 decelerated to Rs.85.6 per Kg during April 1992(i.e the prices declined by 52.91 percent. Other markets in Tamil Nadu registered a similar decline of around 51.57 percent during the

Figure 1

Twelve Month Moving Average Price Of Coimbatore And TamilNadu Markets



same period. On the whole the prices have tended to decline per month between October 1991 and June 1993. Marketing and fall in prices is proving to be achilles of the sericulture programme in Kerala.

It was also a common complaint of the farmers that their product has been discriminated in the Tamil Nadu market. The average price received by Kerala producers are alleged to be relatively lower than the others. There is no statistical evidence to support the view. But so widespread has been the complaint that we are inclined to give credence to it. But we would search for the reasons for the lower prices not in notion of alleged regional discrimination, but in factors such as the technical characteristics of Kerala cocoons. We shall take up this aspect later in the present chapter.

It may be noted that the market for cocoons is a buyer's market where the bargaining power of the farmer is very poor. Since majority of the farmers in Kerala are small and are taking the product individually to the market the output of each is not large enough to command a high price. At the market place where huge quantities are transacted the products of the small farmers are sometimes given the status of waste by the traders. Because of the perishability of the product the farmers are at the mercy of the traders and sell it at the price which the traders are willing to give. Further, it was also widely reported that postponement of payment was common. This necessitates unnecessary repeat journey to the market place. There was also criticism raised against the grading practices of the traders.

SECTION II

Financial Problems:

Though sericulture is known to be a low investment high income reaping activity it requires some amount of fixed investment in mulberry plantation, a rearing shed and rearing equipments. Though mulberry cuttings are given at a low price to the farmers other expenses of mulberry cultivation and rearing had to be met by the farmers themselves.

Financial problems were reported by all classes of farmers. In fact their incidence is slightly higher in the larger landholding size groups. Around 184 farmers had resorted to borrowing to meet the initial expenditure and many of them faced delays in the sanctioning of the loans. The loan disbursement by different agencies by land size classes is shown in Table 5.3. Finance was a major problem for the lower income groups than for the higher income groups. Some of the farmers complained that delays in the sanctioning of the loans forced them to borrow from the private moneylenders at a high rate of interest. Commercial banks rather than co-operative banks had catered to the credit needs of the farmers. Around 61.98 percent of the farmers had borrowed from the commercial banks and 33.7 percent from co-operative banks. Only 8.15 percent had resorted to borrowing from the private money lenders.

Table 5.6

Details of Loan Disbursements by Land Size Classes

(amount in Rs)

Sl. No.	Agency	Land Holding Size Classes 0-.5		.51-1.00		1.01-2.00		2.51-5.0		Above 5.00		Weighted average of interest	Total	
		No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.	No.	Amt.		No.	Amt.
1.	Comm. Banks	3	55.50	12	153.90	40	734.57	43	808.77	42	1164.65	12.93	104	2917.39
		(2.9)	(1.9)	(11.5)	(5.3)	(38.5)	(25.2)	(41.4)	(27.7)	(40.4)	(39.9)		(100)	(100)
2.	Cooperative Banks	1	18.40	4	64.80	15	335.05	21	448.20	21	748.69	12.21	62	1615.14
		(1.6)	(1.1)	(6.5)	(4.0)	(24.2)	(20.7)	(33.9)	(27.8)	(33.9)	(46.4)		(100)	(100)
3.	Private money lenders	1	3.00	-		3	28.60	7	84.40	4	35.50	18.83	15	151.50
		(6.67)	(1.9)			(20.0)	(18.9)	(55.7)	(46.7)	(23.4)	(26.7)		(100)	(100)
4.	Others	-	-	-	-	1	3.00	2	25.00			12.00	3	28.00
						(33.3)	(10.7)	(66.7)	(89.3)				(100)	(100)
5.	Total	5	76.9	16	218.7	59	1101.22	73	1366.37	67	1948.84	12.89	104	4712.03

Note and Source: Same as Table 5.1

The financial activities and escalation of the fertilizer price have been prominently articulated by the farmers. There reportedly was a decline in the artificial fertilizers used. The healthy growth of cocoons requires nutrient rich good quality leaves. The quantity and timings of the fertilizers, type and use of chemicals for protecting the mulberry plants from the diseases are important to achieve this. The most important requirement of mulberry cultivation is the planting of good quality variety of mulberry plants like Kanva-2 planted at a distance of 2" x 2" or 3" x 3", which is adhered to by 85 percent of the farmers. But for lushy growth, it had to be carefully looked after with the application of specified doses of fertilizers and manures and if needed pesticides. There is a wide gap between the actual and the

required use of fertilizers. Table 5.7 reveals the gap between the requirement and actual use. This can result in the poor crop and low leaf output. Insufficient leaves can cause delay in the rearing of the worms or reduction in the number of worms reared.

According to the sericulture programme the special Task Force on sericulture has recommended a subsidy of Rs.2000/- per irrigated mulberry. This has been accepted by the Govt. but subject to individual ceiling of Rs.2000/- There has been widespread complaints of delays in the disbursement of the subsidy.

Table 5.7

Difference Between The Actual And

The Prescribed Use of Fertilisers

(in Kgs)

Slno	Type	recommended doze		actual use
		rainfed	irrigated	
1	15:15:15	133	320	
2	vijay	120	140	63
3	urea	45	320	37
4	Amonium sulphate	100	320	
5	Cal amo sulphate	100	320	
6	cowdung	notspecified		600
7	compost	not specified		151

Source: Central Silk Board.

SECTION III

Technical And Other Problems:

As the technology embodied in sericulture is new to most of the farmers of Kerala , lack of experience created numerous problems for the farmers. We have already hinted at the underlying factors responsible for the relatively lower prices realized by the Kerala farmer may be due to technical defects of cocoons. Available evidence seems to point to this direction. Lack of technical expertise could be reflected better through a qualitative comparison of Kerala cocoons with the Karnataka cocoons as attempted in the table 5.8. Average number of cocoons per kilogram in Karanataka falls in the optimum range of 650-700, whereas ~~in~~ Kerala cocoons fall outside the range indicating smaller size and spun silk content (Jyothish and Jayan, 1993).The higher percentage of urinated cocoons is the result of the defective handling of the cocoons which has resulted from the lack of technical expertise. In properly reared batches, defective cocoons generally will not be more than 10-15%, of the defective cocoons. But it varies from 6.2 - 33.1% among Kerala samples. The average filament length of Karnataka cocoons is around 37% longer than that of Kerala cocoons. Average filament length and average non-breakable filament length are of crucial for getting high prices. The lower value of non-breakable filament length leads to lesser reliability and hence a lower price for the product. All these have pushed down the grade of Kerala silk as low as `E' grade.

Table 5.8

Comparative data of Cocoon Characteristics

Sl.No.	Cocoon characteristics	Kerala	Karnataka
1.	Number of cocoons in 1 kg	739	667
2.	Defective cocoon percentage	16.7	15.7
3.	Shell ratio percentage	16.7	18.3
4.	Urinated Cocoons	5.32	0.40
5.	Melted cocoons	4.28	6.54
6.	Flimsy cocoons	3.38	3.70
7.	Malfarmed cocoons	1.46	0.58
8.	Double cocoons	1.37	2.04
9.	Uzi Cocoons	0.02	2.50
10.	Others (Black skinned)	0.89	-
11.	Average filament lengt	578	792
12.	An non-breakable length	187	592
13.	Average filament denies	2.35	2.50

Source: Jyothish and Jayan (1993)

Poor environmental conditions in which cocoons are reared also adversely affect the quality of cocoons. The most important requirement of the healthy growth of silkworms is the a fairly satisfactory room or shed with adequate number of windows to enable free cross ventilation.The roof should also be sufficiently high upto 10 ft, so that wide fluctuations of temperature outside the house will not affect the conditions inside the house .

Secondly, as per the new technology of silkworm rearing the rearing of young age silkworms should be commenced only after due disinfection of the rearing house or the room and all the rearing appliances with 2 percent formaline solution. Only 74.9 percent of the adopters disinfect the rearing room before the rearing of the eggs with bleeching powder (13.1%), using formaline (30.4%) and using both (31.4%). Disinfecting the room properly can reduce the menace of Uzifly, flacherie etc..

Thirdly once the quality layings have been procured, it should be ensured that the eggs are properly preserved and incubated so that best results of hatching is obtained. If eggs are incubated properly the development of the embryos takes place uniformly and uniform hatching of eggs will result and problem of taking small lot of cocoons to the market can be avoided to some extent. Eggs should not be exposed to excessive heat or dryness for safe protection and preservation of the eggs, the ideal conditions required are about 25°C temperature and about 80 percent relative humidity (Krishnaswami, 1990). Therefore, the egg sheets should be spread out in a single layer in rearing trays and covered with either paraffin paper or ordinary newspaper. In Palakkad district only 39 percent of the farmers regulate the humidity and the temperature in the room.

Once the spinning has started, the farmers are not supposed to move mountages from one place to another. The survey revealed that 62.6 percent of the farmers said that they never move the mounting tray from the place where it was kept first. The rest it should be assumed that had moved mounting trays which results in the stopping of spinning for a while by the worms. A breakage may result in spinning which may reduce the reelability of the cocoons. The requirement of the keeping the mounting tray at 45° was followed only by 57.9% of the farmers.The larger number of urinated cocoons seen in Kerala cocoons is the result of the absence of proper spacing of the worms.

The irrigation has to be done after examining the structure and moisture of the soil. The quantity and requirement of

irrigation varies with the structure of the soil, moisture, and type of soil. But it was seen from the survey that the practice of soil testing is absent among 86 percent of the farmers. Only 8% of the farmers add manures and fertilizers and irrigate the land according to the requirements of the soil. This gives an indication of the fact that the instructions to the mulberry cultivators are not followed properly.

The quality of cocoons also depend on the quality of seeds and the difficulty of procuring seeds was also reported by the farmers. It has been the policy of the Government to popularize the adoption of bivoltine race of cocoons in Kerala. But it is seen that in spite of the concerted efforts on the part of the diffusing agencies majority of the farmers had adopted the crossbreed variety of cocoon seeds since it is well known to have more resistance to the adversities. Farmers have complained that the mixing of various variety of cocoons is prevalent in some of the markets of Coimbatore. There were also incidences of non hatching of the seeds. But we were not able to analyze whether it is due to lack of care on the part of the farmers while transporting it from the place of sale to their farms.

As the silkworm seeds are more vulnerable to diseases at the very early stages which may result from the unhealthy surroundings in which they are being reared the states of Karnataka, Tamil Nadu etc. have established Chawki Rearing Centers (CRCs). Though the need for establishing CRCs had been mentioned in the Project proposals for sericulture development in Kerala, are yet to be established.

Adverse climatic condition has been reported by 14 farmers as an important problem faced by the farmers.The incidental difficulties like protest by the labourers of the paddy fields against conversion the land for mulberry cultivation, the holding of trucks carrying mulberry cuttings and check post, are the other problems faced by the farmers.

SECTION IV

Analysis Of Adopters who Dropped Out From Sericultures:

Reasons for withdrawal

Around 110 farmers comprising 22.5 percent of the total had withdrawn from sericulture at the time of the survey. We have attempted to compare the socio-economic characteristics of those who had abandoned as also those who are continuing. However as can be seen from the table 5.9, to 5.14 that there was no difference in the socio-economic characteristics of two the groups. Surprisingly there was no significant difference between the two groups in terms of formal training received.

The period of entry into sericulture seems to have an influence on the existence in the industry can be seen from the Table 5.15 only 17.19 percent of the farmers who entered sericulture before 1988 had abandoned sericulture. The ratio rises to 24 percent in the subsequent periods. The incentive of higher income might have attracted a larger number of cultivators who did

not have adequate aptitude for the new enterprise. However more relevant for our discussion is the year of exit. As seen in the Table 3.1 of Chapter III more than 94 percent had abandoned sericulture in 1992- the year of sharp price decline. The suspicion of depression in cocoon price forcing out large number of farmers from sericulture (Table 5.2), is confirmed by the reasons reported for the abandonment of sericulture by the farmers (Table 5.15).

The most important reasons given were the price instability and the difficulties in a marketing. Crop failure at rearing stage is the next most important factor for farmers abandoning sericulture.

Table 5.9

Distribution of the farmers who abandoned sericulture

On the basis of training

	Left	Continuing	Total
Trained	85(77.3)	312(82.8)	397(81.5)
Not trained	15(13.8)	65(17.4)	80(16.43)
Total	110(22.6)	377(77.4)	487

Note and Source: Same as Table 5.1.

Table 5.10

Distribution of the Adopter who abandoned sericulture by the Educational Qualification

Level of Education	Category of farmers		
	Abandoned	Continuing	Total
1. Illiterate	9(8.2)	57(15.1)	66(13.6)
2. 1 - 4	16(14.5)	59(15.6)	75(15.4)
3. 5 - 10	58(52.73)	157(41.64)	215(44.15)
4. Matriculate	11(10.0)	54(14.3)	65(13.3)
5. Degree & Professional Courses	11(10.0)	35(1.1)	4(9.28)
6. Others	5(4.55)	15(3.98)	20(4.11)

Note and Source: Same as Table 5.9

Table 5.11

Distribution of Farmers who abandoned sericulture By the Occupation of Head of the Household

Occupation	Category of farmers		
	Abandoned	Continuing	Total
1. Agriculture	71(64.5)	258(68.4)	329(67.6)
2. Agricultural labourers	4(3.6)	13(3.4)	17(3.5)
3. Wage Labourers	8(7.3)	30(8.0)	38(7.8)
4. Cottage Industry	--	2(0.5)	2(4.0)
5. Other self employment	6(5.5)	5(1.3)	11(2.3)
6. Industrial labour	--	4(1.1)	4(0.8)
7. Salaried job	7(6.4)	22(5.8)	29(6.0)
8. Others	14(12.7)	43(11.4)	12(2.5)
Total	110	377	487

Note and Source: Same As Table 5.10

Table 5.12

Distribution of Farmers who abandoned sericulture

By the Income Classes

Income Classes	Category of farmers Abandoned	Continuing	Total
1. Less than 500	43(39.1)	162(43.0)	205(42.1)
2. 501 - 1000	35(31.8)	105(27.9)	140(28.7)
3. 1001- 1500	6(5.5)	38(10.1)	44(9.0)
4. 1501- 2000	11(10.0)	34(9.0)	45(9.2)
5. 2001- 4000	11(10.0)	19(5.0)	30(6.2)
6. Above 4000	4(3.6)	16(4.2)	20(4.1)
Total	110(22.6)	377(77.4)	487

Note and Source: Same as for Table 5.11.

Table 5.13

Distribution of Farmers who Abandoned Sericulture

By the main source

Occupation	Category of farmers Abandoned	Continuing	Total
1. Sericulture	6(5.5)	78(20.7)	84(17.2)
2. Agriculture	70(63.6)	215(57.1)	285(58.3)
3. Wages	8(7.3)	31(3.2)	39(8.0)
4. Salary	7(6.4)	23(6.1)	30(6.2)
5. Pension	5(4.5)	10(2.7)	15(3.1)
6. Trade	2(1.8)	4(1.1)	6(1.2)
7. Commerce	1(0.9)	2(0.5)	3(0.6)
8. Other self employment	7(6.4)	7(1.9)	14(2.9)
9. Others	4(3.4)	7(1.86)	11(2.26)

Note and Source: Same as Table 5.12

Table 5.14

Distribution of Farmers who Abandoned Sericulture

By the intensity of Cultivation

Level of Intensity	Category of farmers		
	Abandoned	Continuing	Total
<25	57(51.82)	165(43.77)	222(45.5)
25.1 - 50	27(24.5)	102(27.1)	129(26.5)
50.1 - 75	10(9.1)	55(14.6)	65(13.3)
Above 75	16(14.5)	55(14.6)	71(14.6)
Total	110	377	487

Note and Source: Same as for Table 5.13

Table 5.15

Distribution Of Adopters Who Abandoned by The Year of Adoption

Year of Adoption	Abandoned	Continuing	Total
Before 1988	11(17.19)	53(82.80)	64
1989	25(24.04)	79(75.21)	104
1990	29(24.79)	88(75.21)	117
1991	23(21.91)	82(78.09)	105
1992	22(22.68)	75(77.32)	97
Total	110	377	487

Note and Source: Same as Table 5.14

Table 5.16

Reasons for the Abandonment of sericulture

Sl. No.	Reasons	land area classes (in acres)					
		0 - .5	.51-1.00	1.01-2.50	2.50-5.00	Above 5.00	Total
1.	Price instability	9	13	23	29	21	95
2.	Technical	3	3	1	2	2	8
3.	Crop failure at rearing stage	7	5	6	4	4	26
4.	Lack of enough mulberry leaves	2	4	4	1	1	12
5.	Financial difficulties	5	3	1	-	-	9
6.	Lack of family labour participation	-	-	-	-	3	3
7.	Increase in the price of chemicals	-	-	-	-	1	1
8.	Increase in the price of fertilizers		1	3	2	3	9

Note and Source: Same as Table 5.15

The problems mentioned above are interrelated. The tedious task at present for the farmers of Kerala is getting a remunerable price for the cocoons. Though the farmers from Kerala are being discriminated in the markets outside Kerala, it should not be forgotten that Karnataka cocoons are qualitatively superior to Kerala cocoons. To the consolation of the farmers in the state the Government of Kerala have announced a support price at the rate of Rs.75 per one kilo gram of cocoons which will be processed and sold either as cocoons or silk. But if this is to fetch a high price,

along with the establishment of the market in Kerala there is need for improving the quality of cocoons, which necessitates strict adherence to the 'package of practices' for cocoon production. Hence the need for strengthening the extension services and other infrastructural facilities. (3) Since the worms are prone to diseases at the early stages of its growth it is desirable to establish more Chawki Rearing Centers.Six CRCs have commenced functioning during 1991/92 in Kerala one each at Agali in Palakkad, Adimali, Anakkara and 3 in Marayoor. (4) Only 2130 DFLs are brushed in the Agali CRC. Another important area where the attention is to be drawn is the silkworm seed production. Sound Seed Organization is an essential complement for quality seed production.Quality dfls play a vital role in increasing the productivity. In the marketing arena and the supply of the equipments and credit to the farmers co-operatives organized by the farmers can also provide some relief to the farmers.

Notes

$$1)\ \text{Shell ratio} = \frac{\text{Weight of shell of 20 cocoons}}{\text{weight of 20 cocoons}}$$

$$2)\ \text{Raw silk recovery \%} = \frac{\text{silk weight}}{\text{shell weight}}$$

3) Renditta % = weight of cocoons required to produce one Kg silk

CHAPTER VI

EVALUATION OF EXTENSION SERVICES

Rural development through the transfer of technologies, necessitates the intense and systematic involvement of diffusing agencies among the rural masses. Their services range from disseminating the information to making the venture successful by the constant involvement wherever and whenever necessary. The positive impact of extension on the dissemination of agricultural technologies has been brought out by many studies. Therefore, in this chapter an attempt is made to evaluate the role of the extension agencies in the diffusion of sericulture technologies among rural farmers. An account of the important services provided by the disseminating agencies and evaluation of their performance is presented in this Chapter. Section I gives an account of the important services provided by the diffusing agencies. Section II provides an evaluation of the technical advice at various stages of production, by the extension agencies to the farmers. Section III analyses the inadequacies in the services as perceived by the farmers.

SECTION I

Services Of the Extension Agencies:

The three main institutional agencies engaged in the propagation of sericulture in the Palakkad District are the Central Silk Board (CSB), the Khadi & Village Industries Board (KVIB) and of late the voluntary agencies like KSSP. The identified farmers are assisted with the following: (a)training in the various aspects

of mulberry cultivation, (b)providing material support like mulberry cuttings and disinfectants at subsidized rates, arranging for the availability of good quality DFLs and making necessary arrangements for the availability of credit at subsidized rates and giving subsidy to the extent of Rs.2000 in the form of rearing equipments and finally , meeting the transportation cost of the identified farmers and (c) technical advice at various stages of production. Apart from this the CSB and KVIB arrange for seminars and group discussions at the village level. For the effective dispensation of the services the CSB has demarcated its area of operation to be Mannarkadu taluk of Plalakkadu district. The area of operation of the KVIB and the KSSP is extended to the entire district of Palakkad. Though for official purposes Mannarkad Taluk has been demarcated as their area of operation, the CSB's helping hand is always extended to the farmers whenever the farmers request their services. The above mentioned services are discussed in detail in the following paragraphs.

One of the most important tasks of any extension agency involved in the diffusion of any new productive activity is to impart knowledge regarding the technical aspects of the activity. With this view the CSB, KVIB and KSSP conducted training programmed to the farmers on the intricacies involved in the rearing of silk worms right from the preparation of land for mulberry cultivation. To provide basic knowledge on the technical aspects of the activity, these training programmed included theory classes and to develop the skills of the farmers practical training either at the training centers, or with farmers specially selected for the purpose, were also given. The distribution of the farmers by the

agency from which they received the training is given in Table 1. The table shows that 45 per cent of the farmers received training from the CSB followed by KVIB (16.4%). The V.O's imparted training to 10.9 per cent of the farmers. A noticeable feature observed is the reluctance of a group of farmers to participate in formal training programmed probably due to their practical difficulties in finding time to attend the training classes, for the training is conducted at far off places from the residences of the farmers. As seen from the last chapter, sericulture is only a subsidiary occupation for many and since they depend on other crops for their livelihood, they cannot neglect them during the training period and hence raised the need for conducting classes in every village. Though 27.8 per cent of the farmers never took part in any of the formal training programmes but learnt it from the other farmers who are rearing silk worms. That friends and relatives are an important source of information in rural area is reiterated by the fact that only 30.6 percent of the farmers came to know about the provision of training facilities from the agencies themselves and 49.1 percent gathered the information from friends and relatives. Another 19.5 percent become aware of it from advertisement and 6 percent from various publications.

Table 6.1

Details of Training received by the Sericulturists

Sl. No.	Agency	No. of persons who received training	Duration of Training					Theory classes		Place of Training	
			<one month	One month	2 months	3 months	more than 3	Yes	No.	Training centre	at Farmer
1	C.S.B.	220 (45.2)		213	4	1	2	181	39	139	81
2	K.V.I.B.	81 (16.6)		76	3	1	1	56	25	49	32
3	V.Os	54 (11.1)		5	1	1	-	48	6	46	8
4	Other farmers	43 (8.8)	10	33	8				43	--	43
5	Not trained	89 (18.3)	-	-	-	-	-	-	-	-	
		487	10	374	16	3	3	285	113	234	164

Note : Figures in parenthesis represents percentages to column total
Source:Census of sericulturists in Palakkad 1992

(b) The Material Support:

For the successful functioning of any new venture, the extension agencies apart from providing training should also keep a close contact with the farmers by providing technical advice of production. Apart from technical advice the farmers are assisted with material support needed. The material support received by the agencies start with the supply of planting materials.The distribution of farmers by the agency from which they received the mulberry cuttings is given in Table 6.2.

Table 6.2

Distribution of farmers by the source of

Collection of Planting Materials

Sl.No.	Source	Number of farmers	Percentage of total
1	CSB	89	18.3
2	KVIB	61	12.5
3	V.Os	9	1.8
4	Neighbours	297	61.0
5	Others	31	6.4
6	Total	487	100.0

Source: same as for Table 6.1

Though mulberry cuttings were supplied at a very low price by CSB and KVIB, most of the farmers resorted to collecting it from the neighbours mainly to cut down the transportation cost and avoid the incidental difficulties involved in transporting it from the distribution centers to the place of the cultivation. Apart from this both CSB and KVIB are providing subsidy in the form of rearing of equipments (worth Rs.2000) to the farmers whose mulberry garden has reached the maturity to start rearing. But a detailed survey conducted in the selected panchayaths of Agali and Kuthannur reveals that, in Kuttannur panchayat though farmers had completed two to six times rearing and had applied for subsidy, they had not yet received the subsidy of rearing equipments. This lacuna on the part of the authorities has to be mitigated as fast as possible.

(c) Technical advice:

The farmers are advised on several aspects during the frequent visits which the extension agencies make.Hence the number and frequency of visits made by the agencies are very important. Table

6.3 gives details of the frequency of visits made by the various extension agencies to the farms.

Table 6:3

The Frequency of Visits by Extension Agencies.

Sl.No.	The Agency	Frequency of visit				
		Once in a week	Once in 2 weeks	Once in a month	Once in a while	When needed
1	CSB	15	21	35	81	75
2	KVIB	9	11	21	65	28
3	V.O.	-	-	-	13	5
4	Friends & Relatives	13	5	7	80	7
5	Others	2	2	1	20	1

Source: Same as Table 6.2

The table shows that the CSB is making the visits more frequently than any other organization. As a result of the efforts of the extension agencies, Kanva-2 variety of mulberry which has been well established to do well under irrigated and rainfed conditions, 85 per cent of the adopters have planted it. But the endeavor of the extension agencies to propagate the rearing of Bivoltine seeds did not meet with as much success. Instead, bivoltine/multivoltine cross breed(CB) variety of seeds has become popular among the adopters. The main reason for switching over to CB was the relatively high resistance of the CB variety to the natural and climatic conditions. It was estimated from the survey that only 23.2% of the farmers adopted Bivoltine seeds.The assessment by the farmers of the technical services of the extension agencies is given in the section III.

SECTION III

Inadequacies in Extension Services:

The inadequacies in training , technical advice and material support are analyses in this section.

(a) Training: In terms of technical and theoretical content training was reported to be inadequate by 27.6 per cent of the farmers.

a.i) Theoretical: Around 11.7 per cent of the farmers had emphasized the need for strengthening the theoretical knowledge imparted during the period.They opined that the farmers are to be enlightened on the different larval stages of the worms, the need for controlling the humidity and the use of hygrometer and foam rubber pad in this relation, the need for keeping the premises disinfected etc.. The lack of sufficient knowledge in these respects had resulted in the improper handling of the worms under different climatic conditions.

a.ii) Technical: The main loophole in the technical aspect was in the handling of the worms, especially the curing measures to be taken up during an attack of diseases. This calls for immediate attention in the context of the crop failure due to diseases at one time or the other by forty percent farmers(table 6.4). Other technical aspects needed to be emphasized during the training period are the spacing of the pupa in the rearing tray and mounting trays. However, except a meager 4.27 per cent, all the farmers who underwent training attained confidence to start rearing.

Table 6.4

Reasons for the failure in hatching

Sl.No.	Reasons	Number of farmers
1	Diseases	196 (40.3)
2	Lack of enough mulberry leaves	41 (8.4)
3	Others	67 (13.8)
4	No of crop failures	183 (37.6)
	Total	487 (100)

Source: Same as Table 6.1

a.iii) Need for conducting training in every village was raised by many farmers especially those who could not attend any formal training programmes. Since sericulture is adopted as a subsidiary occupation by a majority of the farmers they found it difficult to leave their farm lands to attend the training.

(b) Technical advice and Material support: Here, an account of the evaluation of the farmers by the various extension agencies regarding the technical advice at various stages is given to identify the areas where the agencies have fared well and where their services had to be stepped up. Data were collected using interview schedules and attitudes were measured on a five point scale. The perceptions were consolidated and the attitude index was constructed adopting the formulae.

$$\text{Attitude Index } (I_A) = \frac{\Sigma S_{ij}}{\Sigma Max_{ij}} \times 100$$

where Si is the score from the ith individual on jth activity and Maxij is the maximum score possible for the agency from a farmer. The score for material support is calculated by giving a score one for each material supports like (a) Dfls disinfectants (b) chemicals for the control of diseases. (c) sprayer for disinfectants, (d) rearing equipments and (e) planting material, making a maximum score of five for material support. The score for technical advice were given on a five point scale as follows:

Very good	=	5
Good	=	4
Satisfactory	=	3
Bad	=	2
Very bad	=	1

A more detailed analysis of the effectiveness of the extension agencies intervention in each of the major activity in mulberry cultivation and silkworm rearing was collected in the sample survey. The indices were calculated according to the methodology evolved earlier at two levels, (a) for the population as a whole for the two stages of mulberry cultivation and silk work rearing as a whole based on the KSSP survey to facilitate a comparison of the different agencies, (b) for each activity involved, for the different agencies based on the sub sample from the two panchayaths of Kuthannoor and Agali. The extension agencies working mainly in those areas are KVIB and CSB respectively. Hence the identification of the areas where the extension agencies have to improve their services is done on the basis of the functioning of these two agencies.

Table 6.5 and 6.6 put together the evaluation grades of the major extension agencies as revealed by the Census of sericulture

farmers.

Table 6.5

Grades Given by The Farmers For Extension

Agencies In Mulberry cultivation

Sl. No.	Agency	V.good		Good		Satis-factory		Bad		V.bad		Total score		Attitude Index
		No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No. Score
1.	CSB	74	370	26	104	55	165	18	36	54	54	227	729	1135 64.23
2.	KVIB	12	60	17	68	33	99	25	50	35	35	122	312	610 51.12
3.	V.Os	4	20	2	8	4	12	4	8	4	4	18	52	90 57.78
4.	Friends & Relatives	8	40	11	44	37	108	23	46	40	40	119	281	180 47.23

Source: Same as Table 6.1

Table 6.6

Grades Given by The Farmers For Extension

Agencies Silkworm Rearing

Sl. No.	Agency	V.good		Good		Satis-factory		Bad		V.bad		Total score		
		No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	No.	Score	Maxi-mum Attitude Index
1.	CSB	31	155	52	208	61	183	17	34	52	52	213	632	1065 59.34
2.	KVIB	7	35	19	76	26	78	24	48	30	30	106	267	530 50.38
3.	V.Os	3	15	6	24	6	18	5	10	5	5	25	72	125 57.60
4.	Friends & Relatives	7	35	28	112	35	105	31	62	42	42	143	356	715 49.79

Source: Same as Table 6.1

The table reveals that CSB is the agency which is ranked first by the farmers followed by the V.Os and the KVIB is given the third position. The score of CSB came down in the second stage of

production. Coming to the second part of the activity the share of the official agencies have come down which is taken over by the V.Os and friends and relatives.

One of the reasons for the comparatively better performance of the CSB compared to the KVIB is that they have lager number of field assistants to cater to the needs of the farmers in the limited area of Mannarkkad taluk whereas the KVIB with still lesser number of staff without any facilities like vehicles have to travel around the whole of Palakkad district. The farmers also feel that the technical expertise and the dedication of the of extension staff of the CSB is lacking in the case of KVIB. There fore there seems a need for demarcating the area of operation of each agency for the effective functioning of the system.

It could be observed from Table 6.7 that (a) The services provided by the CSB have scored more than KVIB in all the cases. (b) The aspects in which the services of CSB are found remarkable are race selection, moutning, selection of the planting material, planting and spacing of the plants. The extension services provided for marketing, disease and pest control, manuring and fertilizer application are found to be little. (c) the least scored activities of KVIB are marketing, material support, disease and pest control of mulberry and silk worm, manuring, fertilizer application, intercultural operation, moulting stages. Both the agencies fared badly in disease and pest control effective material support and imparting knoewledge regarding moulting stages.

Table 6.7

Grading of The Activities Of The Extension Agencies By The Farmers

Sl. No.	Type of Service	The Agency										Total score			
		KVIB					CSB					KVIB	Index	CSB	Index
		V.good	Good	Satis-factory	Bad	V.bad	V.good	Good	Satis-factory	Bad	V.bad	Total		Total	
1.	Selection of planting material	7	3	11	-	11	11	6	5	-	3	91	56.0	97	77.6
2.	Planting	7	3	11	-	11	11	6	5	-	3	91	53.9	97	77.6
3.	Spacing of plants	7	3	11	-	11	11	6	5	-	3	91	58.9	97	77.6
4.	Manure & fertilizer application	-	-	11	10	11	-	-	5	16	4	64	40	51	40.3
5.	Intercultural operation	-	3	8	7	14	11	6	5	-	3	64	40	97	77.6
6.	Irrigation	-	3	8	-	11	11	6	5	-	3	47	44.4	97	77.6
7.	Disease & pest control	-	1	7	5	16	-	5	4	1	15	51	34.2	49	39.2
8.	Race selection of seeds	7	3	10	-	12	12	5	6	-	2	89	55.63	100	80
9.	Use of disinfectants	7	3	10	1	11	10	5	4	2	4	90	56.3	90	72
10.	Spacing	2	3	-	5	10	10	6	4	1	4	42	42.0	92	73.6
11.	Bed cleaning	8	2	11		11	11	6	6	-	2	92	55.5	99	79.2
12.	Moulting	1	3	9	6	13	11	5	5	2	2	69	43.13	96	76.8
13.	Mounting and handling mountages	8	2	11	1	10	11	5	4	2	3	93	58.1	94	75.2
14.	Disease & Pest control	1	3	10	6	12		6	3	2	14	71	44.38	51	40.8
15.	Material support					32			18			32	20	54	60.0
16.	Marketing					32					25	32	20	25	20

Source: Survey of sericulturists of the two panchayaths 1992

Therefore, the areas which need the immediate attention of the extension agencies are (a) providing assistance in marketing the product, (b) educating the farmers regarding the measures to be taken to prevent the crop loss due to diseases (c) enhancing the knowledge regarding the manuring and fertiliser application etc.

(a) Marketing: The necessity for stepping up the marketing facilities arises from the fact that the possibility of selling the output within the state is very limited. Table .5.2 unfolds the fact that 92.82 percent of the farmers depend on the markets outside Kerala. The difficulties, encountered by the farmers are discussed in Chapter V . This has been the result of lack of vertical integration in the whole of the production process. There are only 12 to 13 reeling units in the Palakkad district out of which three are owned by the government, one by the society, four by the NGOs and the rest are owned by the private individuals. Production of fine variety good quality silk threads, requires the establishment of multiend basin, which requires an estimated cost of around 3.5 to 4 lakh excluding land and machinery. The assistance which the government or the CSB provides is a meagre financial assistance of Rs.10000 as subsidy. From this it could be deduced that the demand which may arise in Kerala or in Palakkad district was less than the supply. This compelled the farmers to seek refugee in the markets outside Kerala.

In the absence of government machinery to channel the products of the primary producers effectively to the consumers, the agencies which can take up the task are the cooperative societies. But in the Palakkad district at present, the role played by cooperatives in solving the problems of the sericulture farmers is meagre. The services provided by the cooperatives to the farmers are given in Table 6.8. This is because of the fact that the societies were formed not by the sericulture farmers but by others with very little knowledge on sericulture. Though 80 respondents had reported that there is a sericultural society in their area, the services

provided by the societies are very little. Lack of finance, and in some cases lack of enough number of members had resulted in the absence of the formation of the cooperative societies.

Table 6.8

The services provided by the Sericulture Cooperative Society

Sl.No.	Type of Service	No.of farmers who availed the service
1	Marketing of Cocoons	2
2	Supply of planting material	1
3	Technical advice	-
4	Supply of loans	-
5	Supply of equipments	8
6	Distribution of fertilizers	1
7	Others	-

Source: Same as Table 6.1

(b) Disease and pest control: Apart from marketing, the areas which requires constant monitoring by the extension agencies are the disease and pest controls management. This assumes greater significance in the context of around 40 percent of the 304 farmers who had faced crop failure, sometime or the other, reported the reason to be the attack of diseases.

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(c) Application of manure and fertilizers: The third aspect where the attention of extension agencies had to be drawn is in the manuring and fertilizer . The base for the healthy growth of the silkworm had to be laid down with the healthy and lushy growth of mulberry leaves. This requires the application of fertilizers and manures in the recommended dosages. But a comparison with the requirement and application reveals that the actually applied amount of manures and fertilizers are much below the requirement.

Hence to step up the mulberry leaf yield the extension agencies have to enlighten the farmers on the vicinity of applying fertilizer and in the prescribed dosages at the prescribed time.

(d) Material support: Another lacunae on the part of the officials was seen in the distribution of subsidies in time. The survey revealed that in Kuthannoor panchayat though farmers had completed two to six times rearing and applied for subsidy, they have not received the subsidy for rearing equipments. Since the KVIB is providing subsidies mainly in the form of equipment, the time lag results in the subsidy becoming completely useless to the farmers.

Therefore, it could be concluded that though the services of the CSB is considered the best by the farmers, there is a need for stepping up the services of the extension agencies both governmental and the voluntary .

CHAPTER 7

SUMMARY AND CONCLUSIONS

Kerala had no history of sericulture before the 1970s. Kerala's climate with a heavy rainfall and humidity was found to be unsuitable for sericulture. But the subsequent technological breakthrough which had generated suitable varieties for the non-traditional agro-climatic situation had provided the necessary impetus for the growth of sericulture in the 1980s. From a mere 350 acres in 1988, the area under mulberry had increased to about 13,000 acres by 1992. According to strategy of sericulture promotion adopted by the Government of Kerala a target of 50000 acres has been fixed for the state.

Mulberry,is found to be an ideal intercrop in Kerala. In view of the crisis faced by the coconut economy of the state, the supplementary income from mulberry forms an important component of the farmer's incomes. Besides, the labour-augmenting technology used in sericulture is formed to be ideal for Kerala with its burgeoning problem of unemployment and under employment. It is in this context that the present exercise is carried out to identify the factors which stand in the way of a faster diffusion of sericulture technology in the state. As the primary objective of the study is to identify the constraints on the diffusion of sericulture technology, analysis is centered around the (1) characteristics of the adopters and their influence on their adoption behaviour, (ii) a comparison of the projected and

actual returns from sericulture and (iii) the efficacy of the services of the extension agencies.

The study may be concluded by summarizing the field enquiries of Palakkad district and by drawing upon their implications on deriving a perspective for diffusion of sericulture technology in the context of Kerala. In doing so we may highlight (1) the socio-economic characteristics of the adopters (2) profitability of the technology (3) the marketing problems (4) the drawbacks in the distribution and rearing practices and (5) the role of extension agencies in the diffusion of sericulture.

(a) A caste based classification shows that 59 percent of the adopters belong to the backward castes of Hindu religion who constitute numerically the largest social group in the district. Most of them must have received land through land reforms. The Christians were found to be more than proportionate to their population share. And their proportion is higher than those of Muslims, Scheduled Castes and Tribes among the adopters who were less than than their population share (Chapter III Section I).

(b) Majority of the adopters are medium farmers with more than 2.50 acres. The available data for these other states indicates that in most of them smaller holders are predominant. We may conclude that sericulturists are drawn fromawide spectrum of land holders in terms of land size, income, education and social

background (Chapter III, Section I).

(c) Except a few all had Garden lands. The proportion of paddy lands possessed by the farmers increased as the land size classes increased. Mulberry has replaced paddy and pulses in 48 percent of the cases. Only 20 percent used waste lands for mulberry cultivation.

(d) On the whole sericulture was a subsidiary occupation of the farmers. Only 17 percent stated it to be the primary source of income.

(e) Around 14 percent of the farmers had entered sericulture prior to the large scale intervention of the government for the promotion of sericulture in 1987-88. The early entrants described as early adopters and the rest late adopters. There was no difference between two groups, in terms of social characteristics. But the following differences have been found in the economic attributes.

(i) The average size of land of early adopters were relatively smaller with average size of land showing a definite positive relation to the year of entry into sericulture.

(ii) The proportion of paddy land possessed by the farmers was higher among the late adopters.

(iii) The early adopters were more dependent on sericulture with 48 percent stating it to be their primary source of income. The rate was only 12 per cent for the late adopter group (Chapter III, Section II)

(f) Rate of adoption does not show any definite relation to socio-economic attributes, but it must be cautioned that we have defined rate of adoption in a manner of proportion of land converted into mulberry in the farmer's holding (Chapter III, Section III).

(g) The rate of adoption in terms of scientific cultural and rearing practices adopted by the farmers is far from satisfactory. The fertilizer use was inadequate, the rearing sheds are not scientifically maintained and numerous defects are found in the technique of handling cocoons. As a result the quality of Kerala cocoons was seen to be lower in many respects as compared to the Karnataka Cocoons (Chapter IV, Section III).

(h) Marketing is the major problem faced by the sericulturists in Palakkad. In the absence of sufficient reeling and marketing facilities in the district they are forced to sell, their cocoons directly in the Coimbatore market. As a result price realized is lower. Coimbatore was seen to be one of the most volatile cocoon markets in India. The fluctuations in the price of cocoons created severe uncertainties that inhibit rapid expansion of sericulture (Chapter IV, Section I).

(i) Twenty two percent of the farmers who had adopted the technology had left sericulture by the time of the survey. No differences in the socio-economic characteristics are found between those who are still continuing and those who had abandoned it. But almost all of them had abandoned in the year 1992 itself. The most important reason stated was unremunerative price and marketing problems. It may be noted that the prices in Coimbatore had

experienced a dramatic decline in the year 1992 (Chapter V, Section IV).

(j) The comparison of cost of cultivation and rearing actually incurred by the farmers in Palakkad and the project estimates by the farmers of Kerala, exhibits a remarkable similarity, particularly in the working expenses and non material establishment changes. However the returns per acre of mulberry land received by the farmers were seen to be 3.42 percent of the project estimate. The main factor responsible for the low revenue realization is the low output. As against an expected out turn of 800 dfls only 173 were actually being brushed in the sample villages. The productivity assumed by the Government was (45kg per 100 Dfls whreas the realisation was 30.1 in the sample villages. We had not been able to pinpoint the exact reason for the under utilization of the capacity. We have hypothesized that the farmers are still in the learning process or it could have been a reaction to the depression in cocoon prices. It may be also remembered that a significant number of farmers had pointed out crop failure as the reason for abandoning sericulture. The level of capacity utilization was too low to make sericulture economically viable in the year 1992.

(k) Sericulture is a labour intensive activity. But our field survey revealed that in Palakkad the proportion of male and hired labour is effectively higher in Kerala, than it is normally believed (Chapter IV, Section III).

(l) Most of the farmers felt that the services of the extension agencies were inadequate (Chapter VI)

Perspective For The Diffusion of Sericulture:

In the light of the observed patterns and characteristics of the adopters, we comment upon the relevance of particular diffusion perspective as conceived in the theoretical literature for understanding the critical constraint to the diffusion of sericulture in the socio-economic context of Kerala.

It would appear from the foregoing survey that we did not find any dramatic relationship between the socio-economic characteristics and adoption behavior. In particular the size of land holdings which showed a negative relationship to the adoption behaviour contrary to the perception of the Adoption Perspective is a pointer to the fact that the adoption perspective in itself is inadequate to explain the diffusion of sericulture. The characteristics of the adopters which are expected to have a positive correlation with the adoption behaviour are the size of land holding, income, education etc. Moreover, a relatively higher representation of the smaller holders, and those with lesser education etc. among the early adopters and virtually there being no difference in the characteristics of the farmers who abandoned and those who are still continuing the activity strengthen this view point. Secondly, with the abandonment of the activity the sigmoid nature of the diffusion curve has been interrupted. Therefore, sericultural innovations had to be seen in a synthesis of the different perspectives and not on the basis of the adoption perspective only.

The characteristics of innovation which had the greatest influence on the adoption behaviour is the perceived relative high profitability of the crop. This is even more obvious from the fact that though it can be cultivated in the coconut and arecanut gardens as an intercrop, it was seen that it was introduced in 48 percent of cases by substituting paddy. This leads one to argue that relatively higher expectation of profit compared to paddy is the inducement to adopt sericulture. Economic considerations were seen responsible for the abandonment of the activity. We also underline the importance of intervention of external agencies as envisaged in the Market and infrastructure Perspective of technology diffusion for removing the supply side constraints and exploiting the potential of sericulture development in Kerala. The facilities envisaged in the strategy for sericulture development in the 8th Five Year Plan has not yet been carried out fully. Even the cooperative societies have not taken off for want of members and finance and other reasons. The technological package was seen not to have been fully absorbed in the seventies.

Therefore, while demand side is very important the pace of diffusion of technology is equally influenced by the supply side factors. The first stage in the diffusion process according to the market infrastructure perspective is the establishment of diffusion agency through which innovation is made available to the adopters. The strategies adopted by the diffusing agencies are going to be the determinants of sustained diffusion of sericulture. The different perspectives on technology are closely related to each other, though they lay emphasis on the different aspects. Therefore, each should not be viewed in isolation from the other.

Our evaluation of the initial stages of the ongoing sericulture technology diffusion in Palakkad district might give rise to serious pessimism as to the future. The expectation of the high profitability is not realized in the actual field. And a significant proportion of farmers have already abandoned the pursuit. It is here that the economic history perspective would help us the guard against hasty conclusions. As has been emphasized by the protagonists of economic history perspective, innovation should be considered as a continuous activity since improvements brought out by users are to eliminate the defects embodied in the innovation at the early stages of adoption and make it more compatible to the environment to which it is being introduced. Therefore, many of the problems we have enumerated could be considered the teething trouble. They could be overcome with appropriate interventions.

All things considered, any single perspective alone may not be adequate to explain the process of diffusion in Kerala. As the major constraint is the infrastructure it would follow that the intervention of the external agency is necessary for removing the supply side constraints. In the context of a rural technology diffusion it cannot be left to the market forces if the rapid diffusion is to be achieved.

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