1.1. INTRODUCTION

Majority of the Indian population live in villages and eke out their livelihood from agriculture and related occupations. However, the land distribution is highly skewed. About 77 per cent are marginal and small farmers and own only about 29 per cent of the cultivable land with the average size of landholding being around 0.90 hectares (Agricultural Census 1997). With the growth in population and due to land fragmentation the number of marginal and small holdings have been increasing over the years. At the all India level, the marginal and small holdings increased by 64 and 33 per cent from 1970-71 and 1985-86 respectively and by 13 and 12 per cent from 1985-86 to 1990-91 respectively. During the same period the number of large holdings decreased by about 43 and 14 per cent respectively.

Among the Indian States, Uttar Pradesh (UP) ranks first in terms of small holdings (168 lakhs), followed by Bihar (103 lakhs). In southern India, Tamil Nadu (TN) leads in terms of small holdings (68 lakhs), followed by Andhra Pradesh (AP) (62 lakhs). In UP, Bihar and TN, the small holdings constitute 88 per cent of their total holdings while in AP it is slightly lower at 75 per cent. However, the small farmers in UP and Bihar own 52 and 47 per cent of the total cultivated area respectively, whereas, in TN and AP, it is only 26 and 33 per cent respectively. Though Kerala state owns 42.75 lakh small holdings constituting 81.18 per cent of the total holdings, the farmers own 67.46 per cent of the total operated area. Hence, the small farmers in TN and AP states account for lower acreage compared to the northern states.
With the small farmers constituting a major segment of the peasant economy, it is not possible to achieve sustainable economic development without improving their economic condition (Misra and Mitra 1983). To develop small farmers and the agriculture sector as a whole, the Government has taken up special programmes under the Five Year Plans. The Intensive Agricultural District Programme, Intensive Agricultural Area Programme, Multiple Cropping Programme, Dry Land Agricultural Development and Drought Prone Area Programme, Small Farmers Development Agency and Marginal Farmers and Agricultural Labourers Development Agency programmes were launched to make the agriculture sector viable, and also to improve the economic condition of small farmers.

In the Sixth Five Year Plan, the Government of India consolidated all the rural development programmes and launched the Integrated Rural Development Programme (IRDP). This programme aimed at the poorest of the poor to improve their resource base and skills and thereby increase the employment opportunities for better living standards. However, the growth in rural employment did not keep pace with the growing workforce. This naturally led to unemployment and under-employment. Therefore, in the Eighth Five Year Plan, high priority was accorded to programmes designed to promote rural employment through diversification of agriculture and promotion of agro-based industries.

As already mentioned, 77 per cent of the farmers are marginal and small in India resulting in the subsistence nature of farming and low capital formation within the agricultural sector. Small farmers cannot go in for capital intensive technology which is
difficult to adopt in the Indian context as the resource requirements of these are higher than the farmer's resource position and relatively narrow range of options offered by them (Jodha 1988). Small farmers are no exception to this phenomenon of low level capital formation in agriculture (Mallik 1993).

Mehta and Kumari (1990) observe that tenancy cultivation, small farms, sub-divisions and fragmentation invariably act as disincentives to the cultivators to increase production levels. Further, the small farmers capacity to save and invest in agriculture is weakening. These farmers in developing economies, have a low income not because they use the resources less efficiently but because of the lack of technology and resources needed for realising higher productivity (Schultz 1970). Under IRDP, even though, credit facilities are extended to the farmers, the small farmers are considered as high risk borrowers. Higher administrative cost of servicing small loans seems to be the factors behind the neglect of small farmers by credit institutions (Bhende 1986). Thus, reduced access to cheap credit and a subsistence nature of farming, coupled with a poor resource base and lack of cushioning in the face of risk, hamper the early adoption of improved technology by small farmers in developing countries.

diversification is possible by adopting certain commercial enterprises like horticulture, aquaculture and animal husbandry. There is a growing demand for horticulture and aquaculture products. While horticulture needs specific agro-climatic conditions, aquaculture demands higher skill and greater investment. Animal husbandry like poultry, piggery, dairy, sheep and goat rearing provide gainful opportunities to landless and tiny landholding categories. Sericulture gives better returns to farmers in general, and small farmers, in particular, and should be taken up on a large scale (Venkatanarasaih 1992).

1.2. Sericulture

The name of silk - the Greek 'Ser', the Latin 'Sericum', 'Seolc' in Russian and early English, and 'Silke' in Icelandic seems certainly to be derived from the Chinese 'Sz' or 'See'. Sericulture is one of the important agro-based cottage industries. Sericulture provides forward linkages in the development process. It encompasses all activities from mulberry cultivation to silk weaving. Activities like mulberry cultivation and silk worm rearing are mostly taken up by rural people, whereas silk reeling, weaving and other processes are carried out in semi-urban and urban areas.

G S Boulger (1920) said that the history of silk begins, and may very probably end, in China. The Emperor Chin Nong of China the inventor of the plough began cultivating mulberry around 2800 BC. In 2602 BC, his successor Hoan-ti, the inventor of the loom, entrusted his wife Lui, Si-Ling-Chi, with the investigation into the rearing of the silkworm. She is even today Worshipped as Yien-
fi, Goddess of Silkworms. The Chinese also acknowledge her as the inventor of the rearing and silk reeling houses. The Chinese princes revealed the secret to a prince of Khotan braving the penalty of death for divulging the silk secret. In this form the knowledge of sericulture spread from China to Khotan and Khotan to Kashmir and India. However, the dates are uncertain and the approximate date, available, is 140 B.C.

1.3. Problem Identification

India ranks second among the mulberry silk producing countries of the world with 16 per cent of the total raw silk production. Sericulture is practised in 59,528 villages (CSB 1992) out of 6,29,143 villages (Population Census 1991). States such as Karnataka, Andhra Pradesh (AP), Tamilnadu (TN), West Bengal (WB), and Jammu and Kashmir (JK) have established themselves as traditional sericulture states together they account for about 99 per cent of the total mulberry raw silk production in the country. To develop the sericulture industry further, the Government of India has implemented many programmes. Among these, the two important programmes are the World Bank assisted Karnataka Sericulture Project (1980 to 1985) and The National Sericulture Project (NSP) (1989 to 1996), financed by the World Bank and Swiss Development Cooperation.

Sericulture is a labour-intensive industry generating high employment and income (Hanumappa and Erappa 1985a). Besides plantation crops, sericulture gives better income compared to any other commercial crops grown in a region (Thimmaiah and Rao 1986). Most of the silk consumers being from urban middle and rich
classes, it helps in the transfer of income from urban to rural areas (Sinha 1989). Sericulture meets domestic needs such as fuel for cooking, fodder for cattle and manure for the land (Hanumappa and Prabhakara 1993). Moreover, sericulture earns substantial foreign exchange which is essential for the country's economic development (Naik and Babu 1993).

Returns are higher from sericulture compared to other competing crops. Even here, there is no uniformity among all the farm size categories. The mulberry gardens on the large farms are better managed and hence receive more returns as compared to small farms (Hanumappa 1993). A R Rajapurohit and K V Govindaraju (1981) observe that the production efficiency of small farmers is low per unit of land and it is high in the case of large farmers.

This analysis reveals that the importance of sericulture is growing at a faster rate in our country as it gives better returns and generates more employment per unit of land compared to other major crops. Though sericulture is viable for all the categories of farmers, discrepancy exists between the small and large farmers in terms of returns.

Sericulture activities are growing and more so on marginal and small farms. Hence, it is proposed to study the impact of sericulture on marginal and small farms in enhancing employment opportunities and augmenting household income vis-a-vis large farm categories and across other major crops.
1.4. Conceptual Framework and A Brief Review of Literature

This section presents conceptual formulations pertaining to the small farmers based on a review of literature. It is classified into the following three groups:

1. Review of literature relating to the definitions of the term 'Small Farmer'
2. General studies
3. Sericulture-related works

1.4.1. Review of Literature Relating to the Definitions of the Marginal and Small Farmers

There is no well-defined standard definition for the term 'small farmer'. There is a difference between a small farmer who owns a tractor in Punjab and a small farmer who does not even own a bullock cart from Andhra Pradesh. Likewise, differences exist regarding the status of a small farmer across various regions. However, over a period of time, many surveys have been conducted and committees have been appointed to evolve a definition of a small farmer through a study of small and marginal farmers.

The Government of India defined a 'small' farmer as one who owned dry land between 1 and 2 ha, and a 'marginal' farmer as one who owned less than 1 ha. of dry land. For class one irrigated land the ceilings were half of what were fixed under each category.

The term 'small' is referred to both marginal and small farm categories only in this chapter.
The All-India Debt and Investment Survey Report of the Committee of Direction (1965), classified the cultivators according to their asset holding capacity in terms of money:

- **Marginal Farmers** up to Rs 2,500
- **Very Small Farmers** Rs 2,500 to 5,000
- **Small Farmers** Rs 5,000 to 10,000
- **Large Farmers** Rs 10,000 and above.

In 1975, while evaluating the Small Farmers Development Agency (SFDA) in 1972-73, the Committee, defined a small farmer as one whose gross farm income was between Rs 1,200 and Rs 3,600 per year. This range was based on its estimation of potential viability. It was felt that those whose gross farm income exceeded Rs 3,600 were already viable while those who obtained less than Rs 1,200 were incapable of becoming viable.

The All-India Credit Review Committee appointed by the Reserve Bank of India (1969) defined the small farmer as one whose gross farm income did not exceed Rs 3,000. The Committee also felt that a uniform definition of a small farmer applicable for the whole country was not possible. Factors like size of holding, tenurial status, poor quality of soil, lack of irrigation facilities, scanty distribution of rainfall and so on, do have influence in defining the term 'small farmer'. It, therefore, used the word 'small' to indicate 'viable, provided inputs are accessible', and left the precise definition to be worked out at the micro-level depending on the status of the person in relation to the factors noted earlier.
Out of the divergent opinions of the results of surveys and committees, Government of India's definition has been adopted since it considers land as the basis to establish the status of the small farmer. It may be pointed out that the use of the Government of India's definition seems to be universal as it is not only adopted in most development programmes but also in many studies. However, suitable modifications of the definition have been made in the present study.

The following classification has been made based on the landholding size of the farmer irrespective of whether the land is irrigated or dry land. The main criterion is that the land has to be under cultivation by the concerned farmer.

a. Marginal Farmer < 2.5 acres.
b. Small Farmer 2.5 to < 5.00 acres.
c. Medium Farmer 5.00 to < 10.00 acres, and
d. Large Farmer 10.00 acres and above.

1.4.2. General Studies Dealing with Marginal and Small Farms
1.4.2a. Comparative Performance of Large and Small Farms

An attempt is made to compare the performance of the small farm categories with that of other farm size groups. A study by Rao (1966), on alternative explanations of an inverse relationship between farm size and output in India, suggested that the large farmers should dispose the land to small farmers since small farmers are able to put more labour and produce more. If this is not possible, capital intensive technology has to be introduced to make large farms viable. The study itself revealed that whenever large farmers have adopted new technology in agriculture it is
because it would have been profitable for them. But this fact has not been clearly examined. The data, used in this study, are related to the sixties. Therefore, this study cannot be used as a model for the present situation.

Rani's (1971) study on size of the farm and productivity was based on the data of the Farm Management Surveys, Bureau of Economics and Statistics (BES) and Government of India (GOI) conducted in the areas of Integrated Agricultural Development Programme districts. It concluded that there was an inverse relationship between farm size and productivity. She clarifies that small farmers had certain advantages over large farmers in labour intensive techniques. But these can be wiped out with capital intensive techniques gaining popularity among farmers. Even this study fails to convey the magnitude of the difference in the contribution of labour and utilisation of capital with the introduction of new technology.

Studies by Bardhan (1970), Singh (1973), Johol (1975), Rao (1975a), Raju (1976), Ahluwalia (1977) and Raju and Singh (1979) observe that the Green Revolution has resulted in widening the gap in the distribution of wealth and income between the small and big farmers. These observations are too general. It is very difficult to measure the magnitude of the impact of the Green Revolution unless more detailed analysis is made across different agro-environmental and socio-economic conditions.

A study by Saini (1971) on holding size and productivity and of Indian agriculture based on Farm Management data, BES, GOI,
reveals that there is an inverse relationship between farm size and productivity. The inverse relationship exists because of maximum utilisation of family labour by the small farmers and their greater contribution to productivity. Since Saini's study was carried out as early as the seventies, it is doubtful whether one can replicate the same model after three decades.

Another study by Bhattacharya and Saini (1972) based on Farm Management data, BES, GOI, for individual farms, separately for each sample village, applied rigorous tests for the correlation between farm size and gross value of output per acre of gross cropped area. The data related to Ferozepore and Muzaffarnagar of Punjab and Uttar Pradesh respectively for years 1955-56, 56-57, 67-68 and 68-69. The study concludes that correlation exists between farm size and productivity, purely due to the Green Revolution and the adoption of improved technology. Though this study also used Farm Management Data, the area covered and results obtained are different from that by Saini. As noted already, Saini's (1971) study shows an inverse relationship.

Rao's (1975b) study on technological change and distribution of gains in Indian agriculture states that the growth of output among large farms is much faster than on small farms. This higher growth among large farms has been achieved mainly through the substitution of capital intensive inputs in the place of labour intensive inputs. As a consequence, the inverse relationship between farm size and output per acre has been observed under the traditional-labour intensive-technology, which is favourable to small farms, and this does not seem to hold good in areas undergo-
ing technological changes. The main reason which Rao has given is that the large farmers save a greater proportion of the increase in their income than the small farmers and they can augment their investible resources at a higher rate than the small farmers.

Further, Rao observes that despite better access to resources, returns per acre among large farms under the traditional labour intensive technology is lower than among small farms as the cost of hired labour is more. However, improvement in technology, coupled with capital substitution in place of labour, produce output at a faster rate for large farms than small farms.

The above study gives all dimensions of production concerning large and small farmers. It is very clear that before the introduction of new technology (i.e. chemical fertilisers, HYVs, tractors), the small farmers had achieved high productivity. Later it was the large farmers who had the advantage of capital and started producing more. But, a point which is not clear is that before the introduction of new technology, small farmers had the advantage of family labour and productivity was high. This was not so in the case of large farmers. The value of the study would have been enhanced if it had examined the equal production possibility with the advantage of labour among the marginal farmers and the availability of capital among medium and large farmers.

Another study by Rajapurohit and Govindaraju (1981), on employment and income in sericulture, argues that there is a direct relationship between farm size and productivity. However, the marginal and small farmers opt for sericulture since it is a
remunerative crop as compared to other competing crops like ragi, jowar, paddy and potato.

The foregoing evaluation of the studies reveals that while some studies find an inverse relationship between farm size and productivity, others note a direct relationship. This may perhaps be due to various complex agro-environmental factors.

Rathore (1984) studying the contributory factors to the productivity differential between small and large farms based on decomposition analysis concludes that technological breakthrough helps large farmers to produce more per unit of land whereas small farmers have a disadvantage with their limited access to new technology. However, small farms appear to do better than large farms in terms of effective usage of farm inputs in both hilly and semi-arid tropic villages. A common point found is that the component of family labour is observed more in small farms as compared to large farms. Also the contribution of family labour input is high when compared to other inputs in both the areas. But inputs like seed, fertiliser and machine power which constitute new technology and require credit/cash, are found to be more effectively used by large farmers of both the areas. This study clearly argues that labour intensive production technique favours small farmers and capital intensive production favours large farmers.

A study on the similar issue by Ghosh (1986), based on Farm Management data in Hooghly district of West Bengal for different years, finds an inverse relationship between the value of material inputs per acre/ha and farm size in the pre-technological
period. Thus, it is clear that the technological change has had a positive impact on large farms because of their efficiency to apply more inputs (capital intensive technology in place of labour intensive technology). In contrast, the returns are low to the small farm category compared to their larger counterparts. This study is based on secondary data which is fairly outdated.

V Ratan Reddy's (1993) work in 120 villages on new technology in agriculture and changing size-productivity relationships based on 400 households belonging to 40 tehsils of Andhra Pradesh, finds that small farmers have the price advantage. This goes against the widely believed argument that small farmers receive lower prices for their produce due to: 1) low quantities; 2) distress sale; 3) lack of storage facilities; and 4) lack of proper information and knowledge. But the contrary evidence in the present case is hard to explain and needs further probing. Varietal and quality differences across size classes, apart from the aggregation problems, may be the plausible reasons for the small farmers' price advantage. Not only the price but also, as observed by Reddy, the physical quantity is high in small farms as compared to large farms. Further, he observes that in the absence of variations in irrigation and cropping intensity differentials across size classes, there will be strong negative relations between farm size and productivity. A number of studies have proved that these two factors are the main sources of small farm efficiency.

The advent of new technology weakened the inverse relationship in the earlier years when its spread was limited, but the author says that the inverse relationship has been re-establishing with
the wider spread of technology in the later period. It is argued that though large farmers are likely to be the first to adopt new technology, small farmers are likely to follow soon. The author points out that the new agricultural technology is size neutral in the long run as far as its impact on production is concerned. The study concludes that an inverse relationship between farm size and productivity holds good in majority of the regions of AP. However, this phenomenon is not found to be universal. The existing inverse relationship between farm size and productivity is mainly due to the higher labour intensity on small farms. The intensity of material inputs also influences the relationship to some extent. The same author says "The advent of green revolution has weakened the existing size-productivity relationship in favour of large farmers who are modern and dynamic while the marginal and small farmers are left behind as backward and inefficient" (1993: 633).

Even though it is a detailed study the data are outdated (71-72, 72-73, 76-77 and 77-78). During the eighties the agriculture sector underwent a sea change. Hence, there is need for examining the current scenario.

V M Rao (1994) observes that the farmer (typically small, poor and unorganised) has opportunities open to him to increase his output as also to widen his contacts with the markets and the world outside his village. However, it would not be easy for him to make the transition from the survival-oriented traditional attitudes and modes of behaviour which still prevail among large number of small farmers to the ruthlessly competitive environment of the modern markets dominated by powerful organised groups. Further, he
comments about the small farmers' performance as, "There is extensive evidence in the areas where agricultural growth has taken place in India that not only does the small farmer contribute to growth but he is also seen to achieve higher productivity of land than his larger counterpart. In fact, the relatively better performance of the small farmer in this respect is often cited as an argument in favour of radical programme for redistribution of land. On the other hand, it is generally observed in the same areas that the economic status and the lifestyle of a small farmer do not differ much from that of the agricultural labour."

This study does not give a clear picture of the position of the small farmer but it notes that the small farmer is capable of producing high quantity of agricultural produce, and it is also a fact that in some situations and circumstances and, in some areas, his position is worse. The conclusions drawn by Rao have not been supported either by primary or secondary data and they are only general observations based on his vast experience in the field.

1.4.2b. Equal Gains for Small and Large Farmers

A few studies give an entirely different idea of the two views which have already been discussed. A study by Kalirajan (1980) examines High Yielding Varieties (HYVs) programme and its distribution in an irrigated paddy area of a village, Senyampalayam in Coimbatore, TN. It reveals that the distribution of net profits from the HYVs programme in this village is almost similar between small and large farmers.
Another study by Bhalla and Chadha (1983), the green revolution and the small peasant, based on 1,663 cultivating households representing all regions of Punjab during 1974-75 reveals that farmers had adjusted their cropping patterns in full response to the opportunities available to them. All crops were grown by farmers of all sizes classes in spite of the existence of minor inter-group differences in the percentage of cropped area under individual crops. The degree of commercial orientation is evident. It operates as freely on marginal and small farms as on medium and large ones. The study proves that the quality of crop produced by marginal and small farmers does not differ from that of medium and large ones and consequently, product prices also do not differ across farm size groups.

These two studies, even though give contradictory opinion to other group of studies (as discussed in the previous section), have been conducted in agriculturally well developed states like Punjab and TN where even small farmers own tractors and other farm machineries on par with large farmers. However, Rajendran (1993) finds that farm power use is greater among large farm groups compared to small farm groups in TN.

1.4.2c. Whether Small Farmers Benefit by Adopting New Technology?

In spite of the above arguments, some studies reveal that due to adoption of new technology, the small farmers were also benefitted to some extent. A study by Pandey and Kaushal (1980), conducted in Ambala district in Haryana, concludes that systematic farm planning is a paying proposition under the existing technology and with the resource base for the small farms. The adoption of
modern technology along with additional capital borrowing can increase net incomes to a considerable extent. This study argues that even the small farmers benefit from the new technology, provided the required capital is supplied.

Farm Size and Productivity Debate

The foregoing review of literature reveals that, one group of researchers confirm strongly the theory of inverse relationship between farm size and productivity. By and large, these studies have examined farm size and economics of scale during Pre-Green Revolution period. Additionally, most of the researchers use data pertaining to early sixties and arrive at these conclusions. However, after the introduction of new technology (Post-Green Revolution period) the situation has changed and one finds a positive relationship between size, class and productivity. To support this argument, studies indicate that the large farmers can afford to spend more on HYVs, fertilisers and reduce dependence on agricultural machineries thereby reducing the dependence on labour. The small farmers can afford to provide more labour than other inputs.

However, a recent study by Reddy (1993) proves that an inverse relationship continues to exist between farm size and productivity even after the introduction of new technology packages. Thus, it is difficult to identify in these studies how the implementation of modern technology can contribute in the generation of higher income to small farmers. The studies covered in the review of literature present divergent views. Added to this, the data which they have used in the studies are outdated and rely on secondary data and
Farm Management data. Thus, there is a need to examine the issues involved in the vulnerable section - small farmers - of the farm sector with field-based information. The present study intends to examine and give a comprehensive picture about what is happening to small farmers in the agricultural sector, in general, and sericulture, in particular.

1.4.2d. Agricultural Diversification and Small Farmers

Based on a detailed review of existing studies, the earlier section provides an account of the farms with and without the adoption of new technology. This section of the review of literature concentrates on crop diversification and its impact on small and marginal farmers.

Crop diversification in agriculture is practised to avoid risk and uncertainty due to climatic vagaries. At the farm level, diversification may take place in the form of adopting wider varieties of crops called crop diversification and/or in the form of the following new varieties of old crops called varietal diversification. Quite a few studies have been referred to understand the impact of diversification on the agricultural sector, in general, and marginal and small farmers, in particular.

This section intends to discuss the following questions:

i. Do farmers take risk to get higher benefits?
ii. Does diversification help small farmers?
iii. Why diversification for weaker sections?
iv. Does diversification pay more to small farmers?
v. Diversification negative impact on small farmers?
vi. Why do small and marginal farmers diversify?
1.4.2d1. Do Farmers take Risk to get Higher Benefits?

J L Dillon and P L Scandizzo (1978) examine risk attitudes of subsistence farmers in North-east Brazil with 66 small farmers and 64 sharecroppers. This study finds that people took risk when subsistence was at risk. A few other farmers of the same sample offered to take risk when subsistence was assured.

Another study by Binswanger (1978) carries out a sequence of risk attitude experiments on farmers in semi-arid tropics of India with real payoffs. He observes that virtually all the farmers had exhibited intermediate or moderate degrees of risk aversion once the stakes of the game came in the neighbourhood of small to medium-size agricultural investments.

These two studies prove that the marginal, small and sharecroppers take risk by diversifying agriculture when their subsistence is assured.

Quite opposite to the above two studies, a study by Hamal and Anderson (1982) tries to explore risk attitudes of a sample of small farm rice growers in Nepal. They note that farmers in general were averse to risk with varying levels of absolute risk aversion. However, they observe that the risk aversion behaviour tends to diminish with an increase in wealth. It is understood that the small and marginal farmers, to some extent, are risk averse.
Does Diversification Help small farmers?

While cautioning the farmers about diversification, Schultz (1970) observes that the concept of traditional farming long established routings with respect to all production activities. Introducing a new factor would mean not only breaking with the past but coping with a new problem because the production possibilities of the new factor will be subject to risks and uncertainties as yet unknown. The study reveals that crop diversification is nothing but taking risk.

C T Kurien's (1981) work, based on the NSS survey reports, concludes that over a period of time 1950-1975 the cultivation of minor millets and other marginal crops declined, while the cultivation of paddy, groundnut, cotton and sugarcane went up. This is mainly due to higher productivity of a later set of crops. Hence, the farmers diversified their cropping pattern. In fact, Kurien supports the agricultural diversification of the farmers.

A study, by Charsley (1982), notes that in Indian conditions, transformation might ultimately take place but it would take years to build up. This is not because people are averse to new ideas. The peculiarity of Indian culture is 'in general, accretive to accepting the new without rejecting the old'. This study has little validity because Indian experience reveals from Green Revolution packages that people are entrepreneuristic and enthusiastic.

Singh et al (1985) conclude that diversification generates higher income. Based on the study conducted in four villages of
Punjab with 40 respondent households, one of the major findings of their study is that 67 per cent felt that dairy farming was more profitable than crop farming.

A micro-level study by Upadhyay et al (1985) concludes that farmers gradually diversified from coarse grains to cash crops like groundnut, rapeseed, masoor, moong and potato. According to this study, further advancement in technology, availability of irrigation, introduction of fertilisers and access to marketing contribute to concentration of crop enterprises and diversification of other agricultural enterprises in the rural sector. This study also reveals that diversification of food crops to non-food crops helps the development of agriculture sector.

Another study by Giri and Gandopadhyay (1985) conducted in five villages of 24 Paraganas in WB reveals that the farmers who diversified the agriculture not only adopted multiple cropping but also took up non-crop enterprises. The study proves that only large farmers can go for diversification but not the small farmers. On the contrary, there are studies which observe that small farmers can also benefit from diversification.

A study by Madalia (1985) in two villages (a progressive and a non progressive) from Mehsana district of Gujarat state reveals that the crop diversification depends on the progress of the village. It concludes that the farmers from the progressive village have taken up commercial crops and in the non-progressive village they have taken up only food crops. The farmers of progressive village get three times higher income compared to non-
progressive village. Therefore, the author favours diversification of the cropping pattern.

Ashok Gulati (1993), while talking about diversification, states that Indian agriculture should look beyond national boundaries on selective basis. The people should identify the commodities and regions where they have a comparative advantage and open up only in these sectors. To start with, he advises that the farmers can diversify where the risk is less. This study conveys that diversification should be a slow process and taken up cautiously.

B.L. Kumar's study (1993) reveals that productivity is one of the factors responsible for diversification. In the study area, farmers diversified from pulse crops to water intensive and cash crops which gave more productivity per hectare as compared to pulses. Hence, he says there should be crop diversification.

Another study by Acharya et al (1993b) gives an idea that crop diversification takes place because of the availability of irrigation facilities. For instance, in a village of Tamil Nadu, higher water consuming betel-vine crop was replaced by mulberry, which requires less water. It is understood that crop diversification takes place because of the demand and supply of water for irrigation.

These reviews reveal that the crop and varietal diversification in the agriculture sector is essential to develop the small farmers. However, caution is required before venturing
into diversification. Most of the studies view that crop diversification, varietal selection and entering into allied activities would increase employment and income and maintain equity in the rural sector.

1.4.2d3. Why Diversification for Weaker Sections?

The following section attempts to examine why diversification is essential for weaker sections. A study by Ravi and Deenadayalu (1985) reveals that the weaker sections have to diversify their economic activities since it helps in higher employment and income generation.

M P Azad et al (1985) conclude that the crop husbandry hardly meets the basic requirements of the marginal and small farmers. Hence, they are compelled to go in for diversification such as dairying. The study is based on 100 households of marginal and small farmers, selected at random from Etawah district of UP.

An empirical study by Gupta and Tewari (1985) comments that farm diversification may take place as a means of profit maximisation through reaping the gains of complementary relationships or in equating substitution and price ratios for competitive products. Traditional crops do not change the income levels of the poor farmers and diversification is essential. Farm diversification may also be used as a risk precaution. Under the situation of risk and capital constraint for the weaker sections, diversification stabilises farm income at a bigger plane. These considerations make a strong case for farm diversification in Indian conditions specially for small and marginal farmers.
1.4.2d4. Does Diversification Pay More to Small Farmers?

A study by Swamy (1985) intends to assess the impact of additional income and employment potential due to the inclusion of subsidiary occupations such as dairying, poultry and sheep rearing to the crop enterprise. For this purpose, 60 dairy farms, 40 poultry and 40 sheep rearing units, besides 30 farmers who are engaged in only crop production have been selected from different villages in Nandyal taluk of Karnool district in AP. The study reveals that employment generation is high in diversified farms compared to farms with only crop cultivation. Similarly, the net returns are higher in diversified farms than in the selected crop cultivated farms. Thus, adoption of subsidiary occupations has enabled the marginal and small farmers to use more of their labour and earn more income.

Tirath Gupta and Deepinder Mohan (1982), in their study on economics of tree versus annual crops on marginal agricultural land concludes that the individual operators of the marginal agricultural lands will stand to gain significantly by a shift from the annual tree crops.

V M Rao (1985), says that it would be difficult to achieve sustained growth of rural production, income and employment unless the base of rural economic activities goes beyond agriculture to cover agriculture-allied activities and further, non-agricultural production and service activities. While farming itself offers room for intensive cultivation of land and diversification of crop enterprises, it would seem prudent to assume that, general case, rural growth in India would need a balanced strategy looking for
growth opportunities in the farm as well as in the non-farm sectors.

Singh et al (1985) have worked on diversification of Punjab agriculture based on both primary and secondary data of 1983-84. The study suggests that mixed farming (cotton and jowar, wheat and moong) with dairy enterprise combined with crop production gives more profit. Therefore, this set of crops can be suggested to small farmers who have a very high potential to raise their income.

A C Sharma and Rachpal Singh (1985) examine the feasibility of diversification at the improved level of technology on small irrigated farms in the arid zone of Hoshiarpur district of Punjab. They suggest that crop-cum-cattle-cum-poultry farming is the most profitable enterprise for small farmers to gain more income.

D S Thakur et al (1985) attempt to estimate the income from vegetable cultivation vis-a-vis other field crops. This study emphasises that diversification into intensive vegetable cultivation can enable farmers to get yields which are ten times higher than cereal crops per unit of land. As the price of vegetables also remains higher than that of cereals, diversification of small farmers helps them earn sufficient income to make their livelihood.

Another study by Chatha and Singh (1985), on diversification of rural economy of Punjab, concludes that there is an increase of about 64 per cent of family income per unit of land as a result of
diversification only. The diversification is in the areas of dairy and poultry.

A study by Mukundan (1985) states that paddy gives low net returns per unit of land compared to fish rearing. He suggests trying resource diversification is worth on a larger scale for the maximisation of profit from a unit area of land and for the benefit of small farmers with less than one hectare of land.

K C Talukdar and A K Sarma (1995) in their study conducted in Assam, conclude that diversification has neither increased employment and nor income for marginal and small farmers. They suggest that income and employment in small farms can be increased further through adoption of improved technology with adequate size of the enterprises, especially in livestock/birds and plantation crops in two zones of Assam.

The above studies in this section strongly recommend the diversification of agriculture, in general, and marginal and small farmers, in particular. They prove that diversification of agriculture augments income and employment for these categories of farmers. Even though there is a risk factor involved, one has to for the growth and development of the economy.

1.4.2d5. Diversification Negative Impact on Small Farmers?

Some studies have brought out the negative impact of diversification of agriculture, especially on marginal and small farmers.
G Parthasarthy (1971), in one of his studies, says "In the event of non-availability of capital resources, transition to commercial crops requiring higher capital intensity is rendered difficult. This suggests that there could be wide diversity in the programmes meant for small farmers, this depending upon the type of commercial crop and the requirements of capital relative to labour. Small farmers could be expected to show much facility in shifting to commercial crops with low capital-labour and low capital-land ratios and less facility in shifting to crops requiring high capital-labour and capital-land ratios" (1971: 21). He further comments "In the initial period of introduction of commercial crop, marketing presents a formidable problem and this could very well discourage small farmers taking to commercial crops. Even the extension staff targets on only medium and large farmers who can easily be convinced due to their resource richness and greater land holdings but not the marginal and small farmers in the commencement of new crop and hybrid varieties" (1971: 27).

Kanvar Prakash Chand and Ranveer Singh (1985) argue that agricultural diversification and landholding size are directly related to each other in Himachal Pradesh. The difference in diversification index is not much in the case of marginal and small farmers, while it is quite substantial for medium and large farmers. This study has been conducted in low hills and high hills of Himachal Pradesh.

Sankar and Mythili (1991), based on a Farm Management Study for 400 farmers in two districts of Tamil Nadu for three consecutive agricultural years (1981-82 to 1983-84), argue that
diversification is recommended to reduce overall risk of farm business. Since water requirements, resistance to drought and pest attacks and also input requirements vary among crops, and as yields are not perfectly correlated, diversification offers an opportunity to reduce variation in gross and net incomes. For a marginal or small farmer, having only one fragment, diversification may not be feasible. The study further reveals that crop diversification is possible in the year of good rainfall particularly for large farms.

Of the above mentioned three studies, one study argues that diversification may not increase the productivity, income and employment of small farmers. The other two studies argue that diversification itself may not be possible for the weaker sections as it requires more capital and large landholdings. Even though there are arguments for and against diversification on small farms, a majority of the researchers view that diversification, no doubt, plays an important role in augmenting the income and employment of marginal and small farmers. However, most of the studies are based on old data. The data on these lines in the current period are scanty. By considering all the problems and situations the present study has been taken up to guide the policy makers to work for the benefit of agriculturists, in general, marginal and small farmers, in particular.

1.4.2d6. Why Do Small and Marginal Farmers Diversify?

This section concentrates on circumstances under which small farmers diversify their cropping system, and the factors which are responsible for the diversification of agriculture on marginal and small farmers.
P H Coombs and M Ahmed (1964) feel that the government in varying degrees has provided four kinds of needed help to small farmers. The engineering, technical, economic and social service, but rarely have they ever provided the fifth, i.e., management service. These authors suggest that the management services for small farmers combined with the development of participatory institutions like farmers' associations, cooperative institutions and village councils would help them to break away from subsistence life and give them a chance to move into the modernising agricultural world.

Guy Hunter (1970) emphasises that small farmers need various management services to obtain credit and diversify their economy. They also need to have input deliveries on schedule and need help in marketing their produce. Further he points out that it is also necessary to help small farmers to organise their own association to deal with some of these needs.

The paper by Guy Hunter and Anthony F Bottrall (1974) suggest that credit plays an important role in diversification of the marginal and small farmers.

A study by Stevens (1977), suggests three major strategies for accelerating agricultural production on small farms in developing nations. Firstly, increasing farm product prices; secondly, assuring availability and reducing the cost of agricultural inputs to small farmers; and thirdly, to develop and make available new more-productive-agricultural technology, locally adoptable to
small-farm conditions. These strategies definitely influence the small farmers to diversify and develop their economy.

T K Chakravarty (1980) suggests that there should be a separate organisation like SFDA to look into the problems of small farm categories. In addition to this, provision of infrastructure and marketing support would influence the marginal and small farmers to diversify their enterprise.

Contrary to the above study, Kabra (1984) says "creating a sole agency responsible for the cause of the weaker sections is not sufficient. What is really imperative is that the responsibility of all the development departments towards the weaker sections must become integral to the micro-projects formulated for rural development which in turn helps for diversification" (1984: 154).

A study by Prahladachar and Mohanasundaram (1985) concludes that provision of better credit facilities and support services to the marginal and small farmers may lead to diversification. S. Gunashekaran (1985) highlights that expansion of credit and monitoring services will help the marginal and small farmers to diversify.

The foregoing views expressed by many scholars show their concern for betterment of the weaker sections, specially marginal and small farmers. The authors express that credit, infrastructure, extension and management services play an important role to diversifying the farm business.
1.4.3. Studies Relating to Sericulture Activity

This section concentrates on the sericulture industry, its scope, importance and why farmers substitute this for other field and commercial crops.

A study conducted in two silk producing areas in Karnataka, as one growing mulberry under rainfed conditions and the other under irrigated conditions (Rajapurohit and Govinda Raju 1981) proves that sericulture generates higher employment and income as compared to other crop enterprises. The study also proves that there is a direct relationship between farm size and productivity. However, the study consoles marginal and small farmers by saying that these categories are not hindered from accepting sericulture because in relation to other crops like ragi, paddy, potato and sugarcane, it is a rewarding crop even to marginal and small farmers.

A micro-level study by Satheesh et al (1985) provides an objective examination of the potentiality of diversification of farm production for augmenting the income and employment on small non-viable farms beyond the poverty line. For the purpose of comparative analysis, three categories like crop-dairy, crop-sericulture and crop-dairy-sericulture have been examined. The study suggests that crop-sericulture gives high returns for low income-non-viable farmers in the absence of capital or when there is limited capital. If sufficient capital is given to crop-dairy-sericulture farming system, it dynamises the entire gamut of income potential and offers economically viable and practically feasible solution to low income, non-viable farmers with an adoption of recommended technology coupled with adequate credit facility.
H G Hanumappa (1986)\(^2\) observes that sericulture activity has technological advantage since it requires lesser water for cultivation of mulberry. On the economic front, sericulture remains to be a highly labour-intensive activity providing vast scope for both on-farm and off-farm employment. Further, sericulture activities have proved to be economically more profitable than other crops. The main reason being a number of cocoon crops raised on a given piece of irrigated land can be anywhere between four and six per year. On a rainfed piece of land the farmer can raise at least two to three crops per year. Thus, the income flow is regular and assured in sericulture than in the case of any other cash crop in irrigated lands.

H G Hanumappa and S Erappa's (1993) study is based on 747 sericulture households in both traditional and non-traditional areas in Karnataka state. They conclude that the sericulture activity provides greater employment opportunities for both family and hired labourers and also supplements considerably to the total income of the family.

H G Hanumappa et al (1993) argue that promotion of sericulture is to augment employment opportunities in rural areas and semi-urban areas and can be used as one of the strategies to reduce inequalities in rural household incomes. The same study reveals that marginal farmers have shown better results in terms of yield (24.08 kgs.), the small farmer group has performed badly in terms

\(^2\) In this study, Karnataka has been classified into five distinct agro-climatic regions and data have been drawn from 30 selected sample villages spread all over the regions.
of yield (19.6 kgs.), the large farmer group has done better and followed by medium size farmers (21.2 and 21.1 kgs.)\(^3\). However, the authors fail to explain the reason why the marginal farm category does fairly well compared to the other categories.

H G Hanumappa (1993) classifies the farmers into four categories based on the mulberry cultivation area: < 0.50 acre as marginal; 0.50-1.00 as small; >1.00-2.00 as medium and > 2.00 as large, in order to find out the relationship between farm size and productivity. The study concludes that there is a positive relationship between land-size and productivity. However, in rainfed areas, the returns per acre is the same immaterial of land-size with new crops like mulberry.

Another study by Acharya et al (1993a) reveals that the profit realisation is the highest among the medium farmers. The main reason for this, is better garden management and rearing practices and optimum utilisation of resources by this category.

B Mallikarjuna et al (1995) while referring to the importance of sericulture industry, comment that the sericulture industry creates large number of employment opportunities in ancillary industries. This results in generation of employment for the rural and semi-urban population as sericulture industry is usually concentrated in these areas.

\(^3\) The quantity is measured in terms of kgs. of cocoons per 100 disease free layings (DFLs.). DFLs are eggs of the silk worms which are used to get silk cocoon crops.
As remarked in the review of literature, mulberry and silkworm rearing and cocoon production are new enterprises freshly introduced in new areas. Most of the studies commend the performance of mulberry crop. Other than a few studies conducted by Hanumappa and the Beneficiary Assessment team of National Sericulture Project in the Institute for Social and Economic Change, Bangalore, in general, most studies lacked a scientific methodological approach. Hence, an attempt to analyse the issues in detail.

1.5. Concluding Remarks

The proceeding review of literature brings out four major reasons which have prompted the present work in sericulture with special reference to marginal and small farmers. Many of the studies concentrate on the evaluation of different programmes like SFDA, MFAL, DPAP, Command Area Development Programme (CAD) and other programmes. Specific studies, dealing with income and employment generation from crop enterprises and their impact on asset creation and standard of living are scanty.

Most of the studies are based on secondary data or Farm Management data and the authors of these use statistical models and discuss the results. They give only technological factors and family labour as the main reasons for any size-class relationship in terms of productivity. But they fail to give convincing field observations. A few studies, based on primary data have also been collected through structured questionnaires, which do not help since they do not throw light on the field problems. However, there are few exceptions like Hanumappa (1993), Thimmaiah and Rao
This study includes both quantitative data collected through questionnaires as well as qualitative data through participant observation in order to arrive at a reasonable understanding of the problem.

The researchers give divergent views about the relationship between size and productivity. A few researchers say that a positive relationship exists after the introduction of new technology. On the other, some argue that a negative relationship exists between farm size and productivity before and even after the introduction of new technology. Moreover, the data which they had used pertain to the period from 1950s and 1980s. Micro-level studies dealing with size relationship are not many. In the absence of serious studies dealing with development problems even the policy makers find it difficult to implement welfare programmes for the weaker sections. This is one of the main reasons for taking up this study.

Finally, there are several studies on diversification in agriculture and allied activities like animal husbandry, specially dairying, piggery, poultry, sheep rearing, apiculture, aquaculture and so on. Changing from traditional technology to modern technology in agriculture includes plough to tractor, organic manure to chemical fertilisers, local breeds to cross-breeds and local seeds to HYVs. However, there are very few studies which dealt with diversification in crop enterprise itself. There is a paucity of studies on diversification from the traditional cropping
system to the new cropping system. For instance, even though, mulberry is being cultivated since many centuries in Karnataka, J&K, WB, it is only in 1970s that it was introduced in AP and TN.

Mulberry is a new crop which is different from other crops in the sense, that it can be used only to feed silkworms in order to produce silk cocoons, which are the final product. In this enterprise, both farm as well as non-farm activities are involved. Interestingly, mulberry is also not a marketable product. Hence, the proposed study has been taken up to examine the difference between traditional crops and the new crop, like mulberry, in terms of employment and income generation for the farming community, in general, and marginal and small farmers, in particular. Another reason for taking up this study is that AP being a sericulture state next only to Karnataka, has not been given enough attention in terms of social science research.

1.6. Objectives of the Study

In this thesis it is intended to study the farmers who have already diversified to sericulture enterprise. The major objectives of the study are:

1. to study the trends in area under mulberry, production of cocoons and rawsilk over a period of time;

2. to examine the income and employment generation from sericulture across farm size classes. An attempt will also be made to find the factors influencing the returns in different categories of farms;

3. to understand as to what extent mulberry cultivation and cocoon production generate employment and income compared to other major crops across farm size classes;

4. to study the impact of sericulture on the standard of living of the sample households.
1.7. Hypotheses:

The following are the hypotheses formulated based on the review of existing studies.

1. Mulberry cultivation and silkworm rearing generate high income and employment per unit of land compared to the major crops grown in the region.

2. Sericulture augments and stabilises the farm income.

3. Small farmers apply the available inputs efficiently to accomplish equal or higher productivity levels as compared to large farmers in sericulture.

4. Crop diversification with emphasis on sericulture has positive impact on the socio-economic status of the sample households.

1.8. Methodology:

The study has been carried out in the state of AP. This state has achieved the distinction of being the second largest sericulture state next to Karnataka. The area under mulberry cultivation which was just 3,001 acres in 1973, increased to 1,05,785 in 1998-99, expanding at the rate of 1.74 per cent per annum in AP since 1980-81. The production of silk cocoons and rawsilk has shown 6.12 and 8.93 per cent compound growth rate per annum. Hence, it is expected that AP may emerge as one of the well developed sericulture states in the country.

In AP, there were 36 lakh small farm holdings by 1970-71 which increased to 72 lakh holdings in 1990-91, showing an increase of 100 per cent. It is important to note that in AP about 85 per cent of the sericulturists are marginal and small farmers. Among the three regions, in AP, namely, Coastal, Telangana and Rayalaseema, the mulberry cultivation has been undertaken in large areas of

Rayalaseema region. To understand the producers' behaviour towards sericulture with a view to devising sound and successful agricultural policies, it is essential to adequately investigate and quantify the relationship between factors of production and the distribution of crop yields across crops and size classes.

1.8a. Sample Design

To carry out this study, a purposive sampling method has been followed in order to choose the district, division, mandals, villages and the ultimate unit of the farm households. The Anantapur district takes the first place in the area of mulberry and production of cocoons in AP. This is one of the border districts adjoining Kolar district of Karnataka state from where the technology and other infrastructure moved and sericulture enterprise flourished from the beginning of 1980s. Moreover, the researcher's familiarity of the district is also one of the reasons for selecting the district. Of the six sericulture divisions, Hindupur division has been selected based on the area under mulberry cultivation, production of cocoons and the number of sericulturists present in the division. The selection of mandals is also based on the area, production of cocoons and the number of farmers who have taken up mulberry cultivation and silkworm rearing. Therefore, of the five mandals in the division, two mandals, one developed (Parigil) and the other, underdeveloped (Lepakshi) have been selected based on the area under sericulture and production of silk cocoons. In each mandal, 120 households constituting 30 households each from marginal, small, medium and large farm size classes have been selected as the sample for this study. As the study intends to compare the marginal and small
farmers with medium and large farmers, equal representation has been given to all categories of farmers.

The data for the present study have been collected from primary and secondary sources. Secondary data have been collected from various published sources such as Indian silk, statistical bi-annual of Central Silk Board, Plan documents, economic surveys, statistical abstracts, season and crop reports, census reports and others. The primary data at the household level like resource endowments, cropping pattern, cultural practices, input and output have been collected through structured questionnaire, specially developed for this study. The data have been analysed by using suitable statistical techniques along with simple tabular analysis to study the objectives and also to test the hypotheses mentioned earlier. In addition to the above, the qualitative data have also been collected to strengthen the results which have emerged from the quantitative analysis, by using participant observation method. The sources of information have been the village headmen, experienced and dynamic young people, local leaders and government staff.

1.9. The Scope of the Study

The objectives of the study have already been spelt out. Broadly the scope of the study includes economic issues concerning the mulberry cultivation and cocoon production on the one hand, and on the other the employment and income implications of this enterprise. While analysing these issues the focus has been mainly on the performance of marginal and small farmers in the study area. It is assumed that the study will help the policy makers and others
to devise suitable policies for the success of sericulture industry in India. It is hoped that the findings of the study will provide stimulation and insights for further studies in sericulture.

1.10. Limitations of the Study

The study, though dealing with sericulture and agriculture sector in detail, concentrates only on crop diversification providing information on dairy farming. The other allied activities like poultry, piggery, horticultural crops, apiculture, fishery and other occupations have not been explored. It is difficult to cover all these activities in a single study.

1.11. Chapterisation

Chapter I contains introduction, review of relevant literature, research problems, and general methodology followed in the study.

Chapter II highlights the expansion of mulberry area, cocoon production and other infrastructure related to sericulture industry in AP, based on the secondary data.

District and area profile have been given in Chapter III. The income generated through sericulture and other farm enterprises across farm size classes have been discussed in chapter IV.

This is followed by Chapter V which discusses the impact of sericulture on employment generation across different landowning classes. Chapter VI deals with the impact of sericulture on standard of living which includes household income, consumption expenditure and asset creation.

Finally, summary and conclusions from the present study and policy suggestions for further development of sericulture have been given in chapter VII.

For the analysis of Chapter II, the regression statistical package has been used to work out the growth rates to demonstrate the growth and development of sericulture industry in AP, in particular, and India, in general. For the analysis in chapters IV, V and VI, percentages and averages have been used to work out two-way and three-way tables to delineate the difference across size classes and crops.