CHAPTER - 3

REVIEW OF LITERATURE
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A number of studies have been conducted on economic viability of small and marginal farms both by government agencies as well as by the individual scholars. A few related studies have been reviewed to have an idea about the economic viability of small and marginal farms in Himachal Pradesh and various other parts of the country. The present chapter is concerned itself with the existing studies on the economic viability and other related topics. The main considerations behind reviewing the already existing studies is to evaluate these studies in the light of sampling, design, methodology followed and the suggestions made. It is done for the reasons that the present study could be designed in such a fashion that the outstanding points of such works could be incorporated in the present study and any duplications in the work are avoided. This will help in designing the present study with the objectives of the study.

In order to formulate the present study and to adopt the befitting methodology for this purpose, some of the important research works have been thoroughly scrutinized. A brief review of some of the studies with significance in this field has been grouped into three broad sections; (i) Economic viability of small and marginal farmers, (ii) Agricultural diversification, (iii) Sustainable agriculture development and other related works.
3.1 Economic Viability of Small and Marginal Farmers

The viability of farm may be defined in terms of net farm income level which is sufficient for maintaining the minimum standard of living for the farmer’s family. It depends upon the size of farm level of technology, irrigation facilities, cropping pattern and non-land based activities followed on the farms. The available literature concerning economic viability of small and marginal farms has been reviewed in this section.

Dave (1994) has carried out a study of Bhavanagar district in Gujarat related to economic viability of small and marginal farms in rainfed agriculture. The important objectives of the study were: to identify the farmers who were economically viable/non viable under different agro-climatic conditions, to study the costs and returns of agriculture and allied activities pursued by the selected farmers and to identify the alternative strategies/programmes that could be used for imparting viability to the non-viable farms. The study pertained to Bhavnagar district which was purposively selected from the agro-climatic sub-region of North-Southern Gujarat region having low rainfed and low irrigation. The study shows that the small and marginal farmers, with their limited resource endowment, strive for their survival by achieving reasonably high level of resource use efficiency in farm enterprise and also by following other occupations related to agriculture. The author suggested that rainfed farm enterprise by itself will not generate adequate income. Hence, there is a need for upgrading the farm technology as also for providing water harvesting/conservation facility to these farmers it would also be necessary to develop, consistent with the local resource base, other related activities.
Patel (1994) conducted a study on economic viability of small and marginal farms in irrigated agriculture. Author examined the characteristics of small and marginal farmers with reference to their structure, utilization and productivity of resources. And it was identified that the farmers who were economically viable/non viable under different agro-climatic conditions. The study pertained to the Lunawala area of Punchmahals district which was purposively selected farm the agro-climatic sub-region of central Gujarat. The author showed that the small and marginal farmers, with their resource endowment, strive to achieve economic viability in farming by utilizing their resources with reasonably high degree of efficiency. The study suggested that irrigation was a major resource which enables small and marginal farmers overcome their handicap of meager farm resources in their goal of achieving economic viability. Nearly 64 percent of the sample farms were found to be economically viable in other areas, where facilities of irrigation are not available to of a large extent, it would be necessary to develop consistent with the local resource endowment, other related activities such as agro-based industries which would help small and marginal farmers raise their income and mitigate problems of under employment and unemployment.

Mallik (1994) in his book economic structure and farm viability, presented the findings of a stimulating empirical study on two Orissian villages. Author suggested the conditions under which peasant holdings could succeed or fail to make their operational units viable, despite the existence of high degree of inequality in the land and non-land resource endowments in the agrarian sector. The study attempted to make a reclassification of agricultural households following the labour use index in the Marxist framework in addition to the traditional index of size class as is usually accepted in most of the studies carried so far. Author has focused attention to one
fundamental issue that hierarchical possession of resource endowments generate exploitative relation at a given point of time and emerge with hierarchy of different salvations with regard to satisfaction of surplus. It strongly pleads for a strong drive with determination towards the redistribution of assets and new organizational innovations in terms of community type of investment on medium-scale irrigation project which has a decelerating effect on the growing tendency of inequality effects arising from private investment on irrigation and crucial bearing on the operational efficiency of small farms and on their viability. The study underlined the urgent necessity of improving the land resource base of the small and poor peasants in particular, while creation of non-land assets for them can only be successfully under-taken through a voluntary cooperative endeavour so as to do away with the constraints relating to credit marketing and other institutional short coming faced by these small cultivators.

Majid (1994) conducted a study on economic viability of small and marginal farmers in Haryana. The objectives of the study were to examine the efficiency of production on small and marginal farms, to identify viable/non-viable farms among them under different agro-climatic conditions and to suggest alternative strategies to their development. The study having been assigned by the Ministry of Food and Agriculture, to be based on a field survey of a sample of small and marginal farms, from different agro-climatic zones of the state. The study concluded that suitable industries within the villages, for which raw material was locally available, should be setup to encourage big farmers to invest in those ventures by providing technical know-how, marketing facilities and other incentives. As these rich farmers will be investing their money, they will be strongly committed to make the project a success. The availability of alternative employment will reduce the pressure of people on
cultivation. This will help in making a large number of small farms viable and remove poverty of the rural poor to a considerable extent.

Shrivastava (1994) carried out a study on economic viability of small and marginal farms potentialities for increasing employment and income. The main objectives of the study were to identify the farms which were economically viable/unviable under different agro-climatic conditions and to study the profitability on small and marginal farms including cultivation and allied sectors of selected households. The author suggested various measures/strategies that could be used for imparting viability to the non viable farms. He defined economically viable farm as the farm which could be viable on an income required for the minimum maintenance of the family. The study covered two most important agro-climatic regions i.e. Chhattisgarh plains including Balaghat district and Kymore Plateau and Satpura hills. One district each from two selected regions was selected on the basis of maximum number of small and marginal farms. From the selected districts a block each was selected on the basis of maximum number of small and marginal farms. From the each selected blocks five villages were selected randomly. Thereafter lists of households was prepared and 10 households per village were selected randomly with probability proportional to the number in marginal, small and medium size groups. The study concluded that in the areas where farms operated in a situation with higher inputs and improved technology the marginal farms to become as potential and adopted better technology as those of the small farms. If inputs were a constraint these should be provided through loans and subsidy.

Ghosh and Majumdar (1992) has carried out a study on economic viability of small and marginal farms, potentialities for increasing income and employment on marginal farms (West Bengal). The study examined the structure and functioning of small and
marginal farms and suggested appropriate policy measures for improving their economic condition. The present study covered two important agro-climatic regions, namely Gangetic Plains and Plateau region of West Bengal. Authors had selected two districts of the state and from each district one block and from each block 5 villages. The number of farms covered under the study was 50 in each district, selected from three categories of farms viz. small, marginal and medium farms in proportion to their weightage in the total population. The study worked out net income per acre on the basis of paid out cost and found that income per acre of cultivated land was lower among the small and marginal farmers than the medium farms. The study also highlighted that there existed a scope for increasing farm employment and also income among the small and marginal farms through adjustments in resource use. It was further observed in the study that the small and marginal farmers in both districts resorted to off farm employment in order to supplement their income. Authors suggested that measures should be undertaken to promote agro based and allied agricultural activities in the backward districts while in counter parts districts non-farm activities should be encouraged in order to generate employment and income for the benefit of the small and marginal farmers.

Saikia (1992) conducted a study on economic viability of small and marginal farms: potentialities for increasing employment and income on small and marginal farms in Assam. The major objectives of study were to identify the farmers who were economically viable/non-viable under different agro-climatic conditions, to study the costs and returns on agriculture and allied sector of the selected farmers, to identify the constraints of small and marginal farms in making them economically viable. The study covered two development blocks of two agro-climatic zones namely upper Brahmaputra valley zone and central Brahmaputra zone. The study
was based on 100 small and marginal farmers. The study highlighted that the problem of under-employment was severe both for small and marginal farms. Author further observed that there was certain areas in the rural Assam if sustainable schemes are involved with proper investment strategy and by providing guidance and skill formation can achieve tremendous success. It was found that the small and marginal farmers were facing economic hardships due to poor resource position and growing gradually due to growth of population resulting further sub-division and fragmentation of holding. The analysis of the study indicated that in case of marginal farmers the crop cultivation alone cannot provide minimum subsistence, it required some subsidiary sources of income to achieve viability.

Vaidya and Sikka (1992) conducted a study on small and marginal farms in Himachal Pradesh, economic viability and potentialities for increasing income and employment. This study examined the characteristics of small and marginal farms, with main objectives of identifying the categories of farmers whose farms were viable under different agro-climatic conditions. This study also identified the categories of farmers who are economically viable/non-viable under different agro-climatic conditions and the alternative strategies/programmes that could be used for imparting viability to the non-viable farms. Authors have divided Himachal Pradesh in to three zones on the basis of altitude viz. low hill, mid hill, and high hill according to different agro-climatic conditions. The design of the study was three stage stratified random sampling with the tehsil level at the first stage of sampling, village or a cluster of 3 village as second stage, and the farming unit the third and final stage of sample. The study revealed that the level of viability varies according to the criterion followed, but even then most of the farms were found to be unviable. On the criterion of meeting out paid out costs all the farms
under consideration were viable whereas it was analysed in the light of actual consumption expenditure, some of the farms turned out to be non-viable and in the extreme when prescribed consumption was assumed none of the small and marginal farms in the state was found viable. Authors suggested that the level of viability can be increased by increasing the size of holding and restoring to giving stress on the horticultural sector, floriculture seed potato cultivation, ginger cultivation hops cultivation, off season cultivation etc.

Deoghare and Sharma (1992) carried out a study on prospects of increasing farm income on small and marginal farms. The main objectives of this study were to examine and find out an optimum cropping pattern and livestock combination at varying capital level of technology in Karnal district of Haryana. The data on input and output of crop, dairy and poultry enterprises were collected for the agriculture year 1986-87 by appropriate survey method. Out of 84 villages in Karnal block, four villages viz. Phusgarh, Drad, Badagaon and Gheer were randomly selected. The farmers were classified on the basis of farm-size and their motive power viz., bullock operated and tractor operated farms. From the small and marginal farms categories, 60 bullock and tractor operated farms were selected for the study. Authors found that there was under utilisation of resources (land and man-power). Therefore, systematic technology and adequate finance based farm planning is necessary for best utilisation of the existing farm resources available with small and marginal farmers. The study also suggested that a liberal credit policy is essential for bringing the small and marginal farmers above poverty line. The livestock enterprise should invariably be encouraged on these farms for increasing the farm income.

Singh and Bhati (1992) conducted a study on increasing farm income and employment in hilly areas in Himachal Pradesh. The main objective of the study was whether the farm sector alone will be
able to absorb the growing labour force gainfully or the streams of labour force migration from hills to plains would further swell. Authors highlighted the scope of increasing farm income and employment in the hilly state of Himachal Pradesh by making comparative analysis of profitability and labour use in cereals vs. vegetable crops. The study clearly revealed that both farm income and employment could be substantially increased by shifting suitable area from cereal crops to vegetable crops and by developing marketing and other infrastructural facilities in the region. Authors concluded that because of natural and other favourable conditions, Himachal Pradesh has a vast potential for the production of fruits and vegetables, which are high pay-off. An increase in vegetable area of small and marginal farms will not only provide gainful employment to surplus family labour, but would also reduce income inequality among different sizes of farms in the state.

Goswami and Meenakshisundarm (1992) carried out a study on prospects of increasing farm income in traditional hill farms of West Garo Hills district (Meghalaya). The present study attempted to develop such optimum farm plans at existing and improved level of resources with capital borrowing and simultaneous hiring of capital and human labour. The selection of the study area was made on the basis of the intensity of shifting cultivation. Therefore West Garo Hills district was selected for the study. Five villages dominated by shifting cultivators were selected at random. Farms were classified into small, medium and large farms. A sample of 100 farmers practicing shifting cultivation was selected by following the probability proportional random sampling technique from the selected villages. Authors found that credit and human labour along with improved technology are the major operative bottlenecks on the hill farms. They suggest that extension agencies involved in the area
have to play an active role in providing the input supplies and in preparing the farm plans. In order to convert the uneconomic farm activity to a viable proposition, not only credit facilities should be extended to them but also the adoption of improved technology must be encouraged to generate additional income and employment.

Singh, Thapaliyal and Mahuley (1991) carried out a study on economic viability and potentialities for increasing income and employment of the small and marginal farms in Uttar Pradesh. The main objectives of the study were to examine the characteristics of small and marginal farms, to study the costs, returns and economic viability of these farms, to evaluate the potentialities for generating additional income and employment on these farms, to identify concentrations responsible for economic non-viability of small and marginal farms, and to suggest measures for making them viable. Authors have undertaken two important agro-climatic regions of the state namely, the upper Gangetic Plain region and the middle Gangetic Plain region. One district from each region and two development blocks from each district, and again three villages per block were selected on the basis of maximum number of small and marginal farms. The study revealed that there was predominance of sub-marginal and marginal farmers in both the regions and their main occupation was crop cultivation. The potentialities of intensification and diversification were more on small farms as compared to the sub-marginal and marginal farms in both regions. It has been suggested that diversified and mixed type of farming should be encouraged among small and marginal farmers. And the availability of land should be cultivated more intensively for achieving maximum production. Along with proper use of improved and modern inputs should essentially be done on the small and marginal
farms. The available infrastructural facilities for the small and marginal farmers should be developed and made more effective.

Deoghare et al (1991) studied impact of credit and technology on income and employment of small farms under different farming systems in Karnal district (Haryana). The main objectives of this study were to examine the impact of credit and technology on income and employment on small farms practicing different farming systems in Karnal district of Haryana. The study pertained to Karnal block of Karnal district which was well known for its progress in the field of agriculture in Haryana. A list of the farmers of the four villages and their different farming systems as practised was prepared and the motive power available with them were noted down. The farmers were further classified on the basis of farm size and their motive power viz., bullock operated and tractor operated farms. The input-out data which pertained to agriculture year 1985-86 were collected through survey method. Mixed integer linear programming technique was used for optimization of net returns of various crops, dairy and poultry activities to assess the impact of credit and technology on income and employment on these farms. As far as the utilisation of human labour on these small farms was concerned, it was observed that optimization of resources at recommended levels of technology resulted in providing larger opportunities for employment of human labour on both categories of farms at the existing level of technology. Authors further observed that on bullock operated farms recommended technology had almost similar effect in improving employment situation as over existing technology with or without capital constraint under crop poultry farming system.
Guleria and Tewari (1990) carried out a study on the prospects of increasing farm income on tribal farms of Himachal Pradesh through new technology and credit. The district had been divided into two zones on the basis of agro-climatic conditions for the study. Authors concluded that the adoption of new technology without borrowing, brought about 40 per cent higher farm income on large farms whereas it ranged between 15-27 per cent on small and medium farms. The study further revealed that by providing adequate finance to the large farms in Lahaul region. They could increase their income by adopting new technology. It has been suggested that economic status of tribal farms could be substantially improved if the Government launched a programme to educate the farmers about the new technology and provided adequate credit to purchase the inputs.

Marothia (1990) in his paper economic viability and sustainability of small and marginal farm analysed that the number of small and marginal farms was increasing over the time because of the break-up of the traditional joint families. The study was conducted in the Raipur district of Madhya Pradesh. A three stage stratified random sampling design was used with the blocks in the district, the villages within the blocks in the district, the villages within the blocks and the farmers and households, in the villages representing the first, second and third stages of sampling respectively. To work out the economic viability, a composite yardisk criterion, comprising of a measure of efficiency such as per hectare gross value of output farm business income, input-output ratio on the basis of cost of production of crop enterprises and the customary level of living standard was considered in the study. It was found that
small size of farm coupled with poor resource base and lack of
information were important constraints affecting the viability and
sustainability of farmers. Author suggested that un-viable farmers
may be made viable through intensive use of growth promoting
inputs, creating additional irrigation facilities and use of improved
methods of cultivation. Further, continuous flow of technical
information from agricultural scientists and extension workers, and a
close coordination among various government and non-government
agencies involved in small and marginal farmers development was a
prerequisite for uplifting non-viable farmers.

Parmar (1989) carried out a study on tribal development in
Himachal Pradesh with special reference to Kinnaur district. The
study revealed that the majority of the tribal population in Kinnaur
was cultivators. The workers also engaged in other activities such as
livestock, forestry, plantation of orchards, hunting etc. Study further
stated that there had been a remarkable growth in the socio-
economic infrastructure like education, medical and health, transport
and communication, banking and electricity supply. Author
suggested that the concepts of mobile hospitals, mobile post office,
mobile banks even mobile school can provide much more effective
instruments of change rather than putting a lot of money in erecting
buildings and maintaining offices.

Thakur, Sharma and Moorti (1988) conducted a study on tribal
development in Himachal Pradesh. The main objective of the study
was to study the impact of Tribal Development Programmes on the
socio-economic conditions of the tribal. This study found out that
the household income of the tribals increased over a period of time
due to rural development programmes. The study concluded that the small and marginal households were more dependent on agriculture, livestock, and wage work, whereas large farmers were dependent mainly on horticulture, services, trade and business activities. Authors further concluded that in order to supplement the meagre tribal households income, agricultural and horticultural as well as the production of wild products such as zeera, vegetables, fruit seeds be encourage through tribal development programmes.

Chauhan et al. (1988) in their study on potential and performance of agriculture and allied sectors in tribal areas of Himachal Pradesh examined the potential and performance of agriculture and sheep farming on tribal farms of Bharmour tehsil of Chamba district. The study concluded that among the farm resources, sheep contributed the highest income varying from 43.3 percent on small farms to 80.07 percent on large farms. This exhibited that as the size of sheep herd increased the income per farm also increased which could be attributed to the fact that the cost of rearing sheep decreased for larger herd size conforming to the principle of economy of scale.

Oberoi (1988) conducted a study of Pangi tehsil in district Chamba of H.P. on constraints in agricultural development. It revealed that the tribal agriculture of Pangi valley was primitive and subsistent in nature. Modern technology has not been able to have an impact in the tribal area because of non-availability of critical inputs of the right type, lack of transportation and marketing facilities, electricity, inadequate extension service, scarcity of fodder and weak co-operative structure. Due to these factors, the farmers of these areas are not economically viable. The study suggested that
once these constraints were removed the scope for agricultural
development of the Pangi tehsil would increase.

Government of Himachal Pradesh (1984) carried out a socio-
economic survey in Chamba district. The main objective of the study
was to analyse the socio-economic conditions of the inhabitants of
the Bharmour tribal area along-with the impact of various
development programmes on the people. The study found out that
the poor inhabitants of Bharmour tribal area earned their livelihood
mainly from agriculture, rearing of sheep and other family enterprises
such as spinning and weaving etc. The study concluded that about
78 per cent of the selected population was illiterate. Out of 24 per
cent literate population, 19.4 per cent was below matric. About 50.2
percent human labour was spent on non-gainful activities and 49.3
percent in gainful work i.e. 12.4 per cent in agricultural work and
37.4 per cent in non agricultural activities. Lastly study indicated
that about 37 per cent of the sample households were in need of loan
for improvement in agricultural land, purchase of drought animal,
agricultural implements and households consumption purposes.

Thakur et al (1984) conducted a study on problems and
prospects of the tribal economy of Himachal Pradesh. The study
found out that the government efforts and development work taken
up under Integrated Tribal Development Projects had educated and
exposed the tribal population and also made them aware of their
social and economic rights. The study revealed that the cropping
pattern was rather traditional with little modernization. Study
suggested that the different development programmes had
increasingly provided gainful employment to the tribal over and above
the farming occupation under Integrated Tribal Development Projects.
The study also found out that sheep and goats were the most important assets of the tribals in the Pangi and Spiti areas of Himachal Pradesh.

Moorti and Negi (1983) conducted a study on farming systems in Himachal Pradesh. Authors examined farming systems in Himachal Pradesh by studying 118 farms representing low, mid and high hill zone of the state. The study found out that agriculture was the most important field of occupation in different zones of the state. After agriculture the next important field of occupation was off-farm employment which is famous specially in low hill zone of the state. In mid hills vegetable based agriculture was found to be most remunerative.

Mehta (1982) has conducted a study on farm size and poverty in Himachal Pradesh. The objectives of this study were to identified factors constraining improvements on small farms. Author classify this study into three parts. First part of the study examined the historical trends in land use, population growth and distribution of holdings, productivity growth rates and cropping intensity. The second part discussed the various definitions of economic holdings, size pattern of holdings and causes for small size. In the third part a new definition, fitting to the conditions available in the study area Himachal Pradesh is given. A model is developed to work out the optimum farm size, which may provide the farming family the minimum standard of living. The study concluded that those farmers who have extremely small holdings may be induced to give up their landed property and shift to other occupations in their own village. Mehta suggested that the land which has become surplus after fixing
a ceiling on land holdings, should be given to small farmers and not to the landless rural persons. Giving land to landless means creating more uneconomic holding units. Instead land is given to such farmers whose holdings are already uneconomic so that it may lead to their becoming economic and viable farming units.

Chauhan et al. (1973) carried out a study on small farmers problems and possibilities of development. The study attempted to indicate through a comparative assessment of the small farmers efficiency, the technological level of their operations and their resource base thereby identifying the binding constraints and suggesting policy instruments which help small farmers increase their income thus make them viable. The study has also made useful observation on the problems of small farmers and has raised an important policy issue of the inadequacy of credit to small farmers.

Bhati et al (1972) carried out a study on income, savings and economic rational of investment in tribal agriculture. Four tribal and two non-tribal districts were selected for study. The study found out that the working expenditure on the farms of non-tribal was about 4 times higher than that of tribal farms. Since the level of consumption expenditure did not differ, substantially between the two types of farms, the disposable income were about three times higher on non-tribal farms than that of tribal farms. The study also found that non agricultural income constituted a minor part of the total income on both types of farms. The marginal prosperity to save on the tribal farms was lower relative to the non-tribal farms.

Tandon and Murdia (1972) conducted a study on economic viability of farms in Udaipur district of Rajasthan. The main objective
of the study was being to test the viability of farms and suggest solutions thereof, which might have wider application. Authors found out that the size of farms, the extent of fragmentation, tenure status, literacy, irrigation facility and use of improved technology are key determinants of economic viability. Further study revealed that farm size below two hectare was a serious problem to economic viability. This problem of small farms now has become a national problem. In India among the land owning categories, the large farms declined significantly. And on the other hand the sub-small and marginal holdings witnessed a significant increase. Therefore land distribution system among these categories has become a national problem for developing farms on viable conditions.

Singh (1971) conducted a study on problems and prospects of small farmers in two regions of Uttar Pradesh. The study attempted to identify small farmers who are potentially viable, and to lay out in actionable terms specific measures whereby they can be helped to achieve viability through better farm production. Author found out that main problem of the small farmers continue to lack, or fail to apply, the relevant technical knowledge and production know-how to achieve satisfactory agricultural output.

It may be concluded from the above studies that economically viable farm as the farm which could be viable on an income required for the minimum maintenance of the farm family. The level of viability varies from class to class and region to region and according to the criterion followed. Generally small and marginal farms were found un-viable and farmers were facing the economic hardship due to the poor resources and growth of population resulting further sub-division and fragmentation of holdings, so there is an urgent need for upgrading the farm technology.
SECTION – II

3.2 AGRICULTURAL DIVERSIFICATION

The VIII plan had adopted agricultural diversification as a strategy for income augmentation and employment generation. By diversification, we mean a shift from subsistence farming to commercial farming and low value food or non-food crops to high yielding varieties of food and non-food crops. Diversification also means that farmers would not undertake only seasonal crops but also animal husbandry, fishing, poultry, forestry and horticulture etc. In this context different scholars have conducted many studies. Some of them have been re-viewed in this section.

Sharma (2005) carried out a study on agricultural development and crop diversification in Himachal Pradesh. The study was based on both secondary and primary data. The compound growth rates have been used to understand the pace and pattern of agriculture development and for diversification. Herfindhal index was used. Study concluded that agriculture in Himachal Pradesh recorded high growth rates during the past three decades. The horticulture sector also registered significant increase in terms of area and production of fruits. Further agriculture over the years, had diversified towards fruits and off-season vegetable like peas, potato, cabbage, cauliflower etc. The process of crop diversification was however, more pronounced in the districts/ areas enjoying favorable (temperate) agro-climatic conditions. Author has suggested that agricultural development and diversification in the state that contributed to the prosperity of rural economy. The investments in infrastructure and active promotion of marketing arrangements, producer co-operatives, credit facilities, technological innovation and extension services are needed.
Joshi et al. (2004) carried out a study on agricultural diversification in South Asia patterns determinants and policy implications were investigated. The main objectives of the study were: (i) to examine the extent, nature and speed of agricultural diversification in South Asian Countries, (ii) identify determinants of agricultural diversification, and (iii) assess implications of agricultural diversification on food security, employment and sustainable use of natural resources. Authors found out that South Asian countries were gradually diversifying with some inter-country variation in favour of high value commodities, namely, fruits, vegetables, livestock and fisheries. According to them agricultural diversification is strongly influenced by price policy and Infrastructure development (especially markets and roads), urbanization and technological improvements. Study concluded that rainfed areas have benefited more as a result of agricultural diversification in favour of high value crops by substituting inferior coarse cereals. The study further revealed that agricultural diversification was also contributing to employment opportunities in agriculture. There is a need of suitably integrating production and marketing of high value commodities through appropriate institutions. Market reforms in developing and strengthening desired institutions through required legal changes would go a long way in boosting agricultural growth, augmenting income of small farm holders and promoting exports.

Kumar, Sharma and Vashist (2002) studied profitability, risk and diversification in mountain agriculture. The study pertained to major crop growing areas, viz, Nagrota Bagwan and Kangra development blocks of Kangra district of Himachal Pradesh. Farms were selected by using two stage sample random sampling technique. The study suggested that vegetable and dairy was the most appropriate choice for the farmers by which they could increase their
farm income. However, pure vegetable farming was found to be more risky and less remunerative. The coarse cereals, pulses and oilseeds having low profitability did not enter into programming. The study indicated the fact that risk could be decreased if the farmers diversify their cropping pattern. The study further evaluated that there is an urgent need for diversification in agriculture in mountains areas in Himachal Pradesh.

Verma and Mishra (1997) conducted a study on crop diversification and related issue on small farms in North Bihar. The study was based on primary data. Authors found out that small farmers used to cultivate mainly subsistence crops and after meeting their, basic needs of food they used to fulfill their requirement by selling the non-food items. The study further found out that big farmers were more efficient and used modern inputs on their fields. Authors suggested that there are greater necessities to provide modern inputs like HYV seeds chemicals, fertilizers, insecticides and irrigation facility to the small farmers.

Chand (1997) conducted a study on agricultural diversification and development of mountain region with special reference to Himachal Pradesh. The study revealed that vegetable growing was an alternative for agricultural diversification in Himachal Pradesh. Off-season vegetables particularly posses immense potential for diversification. The other alternative for agricultural diversification reported in the study are fruits, floriculture, mushroom and dairy. The suitability of these alternatives of course, vary from location to location depending on agro-ecological conditions and market infrastructure. The study concluded that agricultural diversification has been viewed as a powerful strategy for employment generation and sustainable agricultural development.

Saleth (1996) carried out a study on diversification as a strategy for small farm development in Tamil Nadu. The study
analysed the potentials of crop and non-crop diversification. The main objectives of the study were to find out (i) the land use and cropping pattern (ii) the income, cost and net return both in the crop and livestock enterprises and (iii) the relative employment and income from significant enterprises and activities. The author found that the ability of small farms move towards high value crops would depend upon the extent to which food and fodder requirement can be met through alternative means, adequate employment and income from non-crop enterprise and the presence of a favourable institutional environment. While policy changes required for providing an incentive environment for the crop diversification among small farms will take considerable time to materialize, the prospects for developing other aspects of diversification such as livestock and others is considerably brighter.

Varadarajan and Elangovan (1996) carried out a study on scope for commercialization of small farm agriculture. This study examined that how integrated rural development has bypassed the small and marginal farmers in India. According to the authors, size of farm is not a constraint to diversification. In fact shortage of capital and size of market are the main constraints. Study concluded that however, it may be necessary for the small farms to form groups and pool their sources voluntarily to achieve large scale production.

Chand (1996) carried out a study on diversification through high value crops in Western Himalayan Region, evidence from Himachal Pradesh. The study examines the scope for raising income and employment in various categories of land holdings by diversification through off-season vegetables cultivation and also examines the scope for fruit cultivation in mid hill zone. The study also analysed the impact of infrastructural institutional and socio-economic factors on crop diversification through the vegetable crops. The analysis was based on grassroots level information covering 298
farm households in mid hill zone of the state of Himachal Pradesh. Where necessary arose secondary data have also been used. The author concluded that there was a strong evidence that it was not the farm size but infrastructure like access to motor able road, market and irrigation which determine the extent success and profitability of diversification through high paying crop like off-season vegetables. Promotion of enterprises like off-season vegetables would go a long way in generating productive employment and income in the hill areas of Western Himalayas Region where the size of holdings and per capita land were very small and traditional crops with low productivity were not capable of providing sufficient income and employment to the population depend on the agriculture sector.

Gopalappa (1996) has carried out a study on crop diversification and income levels in Karimnagar district of Andhra Pradesh. The study was based on primary data collected by sampling method. The main findings of the study was that sericulture provided gainful employment to the small and marginal farmers. The study also revealed that a significant change in the income levels and standard of living of the marginal farmers can be attain by way of diversification of the farm activities. Author suggested that appropriate cropping pattern along with financial facilities the diversification of crop can be increase income and employment of small and marginal farmers.

Shyam and Gupta (1995) conducted a study on diversification on small and marginal holdings in low productivity areas. The present study was undertaken to examine the existing production system and explore possibilities of diversification of weaker holdings. The survey was conducted during 1992-93 in Uttar Pradesh and 60 weaker farmers were selected from 4 villages of Bareilly district which is a low productivity area in Uttar Pradesh. The study has brought out that the resource constraints, social factors, organizational
constraints, lack of suitable technology, lack of development orientation etc. were such factors as frustrate the diversification on weaker holdings. The study suggested that the awareness of the people, provision of technical training and credit, creation of infrastructure etc. appear viable steps to tackle the problem.

Bhati et. al (1992) conducted a study on diversity of mountain farming systems in Himachal Pradesh. The main objective of the study was to find out the structural and the operational features of farming systems in different ecological zones with the mountains. Study was based on village level and farm level studies in different regions of Himachal Pradesh, illustrated the same. Authors also presented a sketch of the diversity of the mountain areas in Himachal Pradesh by comparing broad characteristics of different ecological zones. This was followed by a discussion on structural and operational features of farming in these regions, as revealed by the field studies in the selected villages. The study also emphasized the inter-dependence of different activities at the farm level that help sustain the farming system. The study summarized some of the public measures taken and describes farmers responses to specific mountain conditions such as inaccessibility, fragility and marginality. It concludes with the enumeration of practices and measures adopted by the farmers to harness opportunity and to manage constraints in the study village.

Chand (1986) has carried out a study on diversification of agriculture in Himachal Pradesh with a spatio-temporal analysis. The study concludes that agricultural diversification was of complex nature in Himachal Pradesh due to various agro-climatic conditions between different agro-climatic regions. Diversification has taken place at all levels, but appeared to have benefited more the districts falling in mid and higher hills zones and also the medium as well as large farmers. There was potential for development of horticultural
crops in lower hill zone but also it has remained untapped due to lack of technical know-how among farmers. For the weaker section land constitutes major constraints for increasing farm family income.

Saini and Singh (1985) carried out a study on impact of diversification on income, employment and credit needs of small farmers in Punjab. The stratified random sampling procedure was adopted for the selection of villages and farmers. Based on similar topography and agro climatic conditions, the district which was divided into three homogenous zones and two villages from each zone were randomly selected. The study found out that the diversification of crop farming with high yielding milk animals can play an important role in increasing income and employment on small farms. Authors suggested that financing institutions should come forward unhesitantly to provide medium term credit on easy terms to small farmers to diversify their farming with dairy enterprise, which would reduce the income variability and promoted the entire income potential it offers the single best measure to solve the chronic problem of un employment/under-employment of family labour on these farms.

It may be concluded that the agricultural diversification has been reviewed as a powerful and an effective strategy for employment generation and sustainable agricultural development. Diversification refers to a shift from low value of subsistence farming to a high value of food and non-food crops. It may be also concluded that it is not only the farm size but infrastructure like availability of motorable road, market and irrigation which determine the extent success and profitability of diversification through high value of crops.
SECTION – III

3.3 SUSTAINABLE AGRICULTURE DEVELOPMENT AND OTHER RELATED ISSUES

By sustainable agriculture we mean successful management of resources for agricultural development in order to satisfy the changing human needs, while maintaining or enhancing the quality of natural resource base. A number of studies have been conducted by the different scholars concerning sustainable agriculture development and other related issues. A few related studies have been reviewed with a view to have an idea about the sustainable agricultural development and other related issues.

Goswami (2002) carried out a study on farm income and employment vis-à-vis preservation of natural resource base. The selection of study area was made on the basis of intensity of shifting cultivation. The study concluded that systematic farm planning is a paying proportion for making improvements even under the existing technology and with existing resource base on the hill farms. Author revealed that there is a need for suitable credit policy and tribal employment policy along with national allocation of land and input, to increase the profitability and sustainability in tribal agriculture. Study further suggested that adoption of farm plans will help in augmenting the income and employment of the tribal farmers by preserving the land resource from degradation by preventing soil erosion. Thus ecological and economic sustainability could be achieved.

Vashist and Pathania (2001) conducted a study on sustainable development of small farms in Himachal Pradesh. The main objective of the study was to analyse the problems faced by small and marginal farmers and to suggest ways for improving productivity of agriculture crops. For this purpose a sample of 30 small and marginal farmers
was selected by following a stratified random sampling technique from Nagrota block of Kangra district in Himachal Pradesh. The study found out that large and medium holdings have decreased while small and marginal holdings increased over the years in the state resulting in higher human labour pressure on agriculture. The study further revealed that net sown area and gross cropped area in the state have declined. Authors suggested that this can be made up by increasing the cropping intensity i.e. the land which remains unutilized after harvest of rabi/kharif crops can be used for short duration crops. The study concluded that there is a slight change in the cropping pattern and productivity of crops over the years. The productivity of maize, wheat, paddy and oilseeds crops have increased while pulses registered a declining trend. Again irrigated area under maize and rice declined while the reverse was true for wheat and other crops. Authors further suggested that transfer of technology for improved crop productivity needs to be taken up on a priority basis. Since the area under irrigation as well as the fertilizer consumption are not likely to increase substantially, the farmers will have to adopt subsidiary income generating activities like bee-keeping, mushroom cultivation, off season vegetable etc. for augmenting their income.

Kharwal (1998) conducted a study to examine the socio-economic, cultural and demographic characteristics of the population of tehsil Bharmaur in district Chamba. The study revealed that like other tribal regions of the Pradesh, Bharmaur tehsil was too sparsely populated, sex ratio was favourable to males, joint family structure was breaking down, and literacy rate among females was very low. Study also found out that the average cultivated land holding was very small, found being only 0.46 hectare in case of sample households. There were also lack of irrigation facility in whole region.
As regards their occupation most of people were found to be engaged in labour, agriculture and services.

Sharda and Sharma, (1998) conducted a study on development of agriculture in tribal areas of Himachal Pradesh. This study was undertaken or covering period from 1971-72 to 1993-94. It was found that the cropping pattern has shifted in favour of horticultural and other cash crops like hops, like off-season vegetables and vegetable seeds, particularly in Kinnaur and Lahaul regions. The average size of holding in the tribal regions still remains slightly higher than for the state as a whole. The study also revealed that there were adverse agro-climatic and geographical constraints rendered the mechanization of agriculture, so this sector was cost effective so far as food crops are concerned. Authors suggested that appropriate extension services and marketing network can go long way in accelerating the pace of commercialization. Animal husbandry can be made more remunerative by improving the livestock breed. And finally, technological up-gradation of traditional crafts can ensure greater gainful employment to the peoples of tribal areas in Himachal Pradesh.

Haque (1997) conducted a study on sustainability of small holder agriculture in India. He covered Andhra Pradesh, Bihar, Haryana and Rajasthan in his study by adopting a approach of who owns land and who cultivates it. The findings were based on net returns. Author concluded that neither the diversification strategy nor liberalization policy could benefit to small farmers so long as they face self sufficiency constraints relating to input and market constraints out side. Further, it was recognized for enhancing the non-farm income and employment opportunities. At the same time provision of irrigation facilities and technological inputs help these farms. It was also suggested that provisions of enhancement in land to the small holder will not affect their income, only farm
organizations will prove helpful through processing and marketing of product. Finally it is suggested that contract farming and command area approach will prove useful for sustainability of small holders.

Shah (1996) conducted a study on issues relating to sustainable land use in Uttaranchal. He discussed in detail the issues pertaining to the existing land use in Uttaranchal and stressed the need for relevant time series data on land use. According to Shah there was no significant trend in land use. Forest being the major land use in Uttaranchal. The study deals with the reasons for poor management of forest resources, particularly in the forest under Van Panchayat. Regarding agricultural land use the author was of the opinion that in old settled areas traditional farming systems were able to satisfy the need of the people without harming the land. But this traditional system is not extended to new areas brought under plough thus causing degradation of these lands. He cited the experiences gained from the works done at two micro watersheds, namely Naurur and khulgad. In both cases author suggested the need for strengthening institutions at local level by more participation, extension of technological innovations, like the introduction of bullock drawn equipments.

Singh (1996) analysed of the trends in operational holdings in Himachal Pradesh. The main objective of the study was to analyse the trends in operational holdings giving emphasis on the concentration of number of holdings and operational land over different sizes of farm and also to highlight the factor responsible for the variation in the number of operational holdings. According to the author that is marginalisation of land holdings has put a big question mark regarding the viability of such holdings. This marginalisation of holdings was perpetuated by a reverd factors emanating from informal institutional changes to formal legislations. The major institutional changes are the breaking up of joint family system and
various tenure systems while major legislations are the two phases of land ceiling to support small farms and tenants. The study revealed that in Himachal Pradesh land laws and legislations are implemented sincerely and this is the only state in the country where there is no one who is land-less. The trends in number and area of operational holdings in different districts and macro reason like trend in tenurial system, irrigation status and land utilisation are also examined in this study. The study also suggested that new variety of seed, fertilizer and credit to small and marginal farmers rigorously and judicial implementation tenancy law and expansion of off season activities in the rural area should be given emphasis.

Khanna (1995) carried out a study on planning for sustainable agricultural development. This study examined the socio-economic and environmental problems in commercial and traditional agriculture which were obstacle in achievement of sustainability in agriculture. It has explained that neither commercial agriculture nor traditional agriculture was sustainable. Degradation of land has been assessed with the help of remote sensing, imageries, in both commercial and traditional agricultural areas. Author had found out that while on the one hand commercial agriculture creates social inequality and environmental imbalance, traditional agriculture is becoming uneconomic due to selection of defective or degenerated seeds, broad casting method of sowing, poor composting technique and availability of water faulty storage systems, lack of communication and non availability of improved tools and implements etc. in time. But traditional agriculture has potentials to develop as sustainable agriculture if these drawbacks are removed. The diffusion model was tested in a unique manner by considering physical economic, social communication and administrative distances. The study has suggested many alternatives which can take Indian farmers on the path of sustainable development.
Jodha, Banskota and Partap (1992) in their book Sustainable Mountain Agriculture, studied various dimensions and issues relating to mountain agriculture in the over all context of development. Problems and prospects in the mountain areas with special focus on the Hindu Kush Himalayan region have been also analysed in their book. The focus of the text was on the understanding and identification of factors and processes contributing to the sustainability or un-sustainability of mountain agriculture and related activities. Most of the involved issues were identified and analysed with reference to Mountain Perspective-Sustainability Frame work evolved by ICIMOD to examine with the relevance of interventions to specific conditions of mountain. The whole book is divided into two volumes published simultaneously. Volume I focused on agricultural development perspectives, approaches and strategies in the Hindu-Kush-Himalayan region. The long term sustainability issues and use of agro-ecological zonation development planning in mountain areas are the other important aspects covered by volume I. And volume II covered relatively more operational dimensions of the subject where micro-level or project level realities, experiences and implications are reported and analysed. Chapters dealing with farmers strategies and some innovative project initiatives are covered by volume-II.

Verma and Partap (1992) expressed their experience of an area based development in Himachal Pradesh in terms of conventional indicators e.g. productivity and income growth, infrastructure facility, and modern input use and quality of life indicators such as reduced landlessness, education, housing, health and nutrition. Himachal Pradesh is a success story in area based development. Horticulture is accepted as a leading sector in its development strategy and in some cases related activities such as animal husbandry, bee-keeping, and vegetable crops with marketing. In this context situation of low
hill farming is entirely different with that of other zones. Authors find out that only two out of twelve blocks were growing tropical fruits i.e. Mango, Santra, and Kinnow. Almost whole of zone busy in search of non farm income.

Jodha (1991) studied agricultural growth and sustainability: perspectives and experiences from the Himalayas. The focus of the study was on mountain ecosystems in general with illustrations from Nepal, Himachal Pradesh (India), Western Sichuan (China) and other hill areas in North Pakistan. The term agriculture covered all land based activities including cropping horticulture, forestry (agro-forestry), naturalism and animal husbandry. Author illustrated issues such as vicious circle of poverty and resource degradation conflict between agricultural growth and environmental stability/sustainability, possibilities and approaches to reconcile or minimize such conflicts, etc. by referring to traditional farming systems, current resource use intensification induced by various factors including development interventions and some successful approaches to mountain development. The key message of the study was focused on agricultural strategies, that lend to ignore the imperative of mountain characteristics, such as fragility, inaccessibility, marginality, diversity etc. and their interrelationships, may not ensure a sustainable development of mountain agriculture.

Thakur et al. (1991) carried out a study on optimization of cropping pattern and credit requirements for agricultural development in tribal areas of Himachal Pradesh. They observed that there was need for optimizing the cropping pattern of farmers in tribal areas. This study suggested that farmers may invest more on seed potato and off-season vegetables for increasing their income. Authors further noticed that there was a need for supplying inputs like fertilizers etc. as it had positive role in upliftment of poor tribal masses in Kinnaur. The study further observed that the average
farm households in the district invested 70 per cent of their income on farm and residential buildings replacing older structure by new one. Study pointed out that investment on farm implements and equipment was very less and there was a need to concentrate on increasing investment on farm implements by providing implements suited to the area.

Dahiya et al. (1991) conducted a critical appraisal of the changing profile of the state agriculture with a view to imparting a new thrust in the next phase of development. The study was based on secondary data and analysis of the data has been done on the basis of simple statistical tools, namely, averages, percentages, coefficient of variation and the annual compound growth rates. Authors found out that there was an imperative need to take concerted measures for shifting area from the cereal crops towards high value horticultural crops for better returns and more employment in the rural sector. Study suggested that, only an efficient marketing structure can induce the farmers to reap the benefit from their production advantage. The study further suggested that accelerated development of the horticultural crops and other cash crops on scientific basis alone can usher in an area of sustained growth and prosperity in an agriculturally dominant hill economy such as of Himachal Pradesh.

Chand and Swarup (1988) studied development of agriculture in Himachal Pradesh. It was found that the overall agricultural development did remain a priority of the Government, but due to its own limitations in production base (mostly natural), the growth in production and other services could not keep pace with expenditure and net domestic product of the state. From the point of view of plan expenditure, rural development needs special attention and from the point of view of improvement in technology Himachal Pradesh deserves particular attention. Authors suggested that a package of
technology should be evolved to increase the yield and fill the gap between existing and potential based on the agro-climatic conditions and resource endowments of the farmers. To bring about improvement in the agricultural sector, there is need for creating and upgrading infrastructure.

Chand and Singh (1985) carried out a study on diversification of agriculture in Himachal Pradesh: a spatio-temporal analysis. In this study an attempt has been made to examine the degree of diversification in hill agriculture. The study was based on both primary and secondary data. The results of the study showed that during the early seventies the degree of crop diversification was very high in the districts falling in the mid and high hills. In this region farmers grow subsistence as well as commercial crops. In low hills the diversification was of medium and low level. High level of agricultural diversification in the mid and high hills is due to climatic advantages. Study found out that farm level analysis also indicated direct relationship between the extent of diversification in agriculture and altitude. Study also indicated that availability of resources is a necessary condition for inducing diversification at the farm level. Authors further suggested that there is a need to give equal emphasis on the development of horticulture in this region.

Raju (1982) carried out a study on impact of new agricultural technology on farm income distribution and employment. The specific objectives of the study were to measure the income inequality in the IDAP district, West Godavari for the years 1967-68 and 1970-71, to isolate measure the net influence of new agricultural technology on farm income distribution in the district, to determine whether wages and employment have increased or remained constant or decreased in the study area, and to quantify the impact of new farm technology only human labour employment in the district. The changes in size distribution of income were measured in the terms of
the Lorenz curve, the standard deviation of log income the Gini concentration ratio and the coefficient of variation. The multiple regression technique was used to measure the impact of new technology and other variables on income distribution and employment. The findings of this study contradict the commonly held belief that income inequality has been increasing since the major technological break through in Indian agriculture took place. The findings have also demonstrated the possibility of simultaneously increasing the mean level of farm income and reducing income inequality as well as improving the living condition of farm labour.

Shah (1979) conducted a study on farming systems in hill areas and put forth the idea that the cropping pattern over time in the hill had not gone under any significant changes. The study highlighted the problems and prospects of hill farming. Author emphasized the need for identification and evolution of appropriate farming systems, socio-economic and technological factors determining cropping pattern, integration of agro-based forestry and animal husbandry. The study suggested that in the hill areas different farming activities like cultivation of field and plantation crops, animal husbandry, fisheries, medical herbs, fodder grass etc. determined according to soil fertility and potentiality of the area and justified in terms of economic viability and soil acceptability. The study concluded that the optimum product would differ from region to region due to varying agro-climatic conditions. The author pointed out that extension network was weak and stressed the need for well trained persons on hill farming system.

Johl and Kapoor (1977) carried out a study on fundamentals of farms business management. Authors observed that the resources at the command of small farmers are extremely limited. And this limit affects their capacity to produce. Hence they try to concentrate their resources on production of food requirement for family consumption.
Authors found out that only the resource available in plenty is generally the family labour, but there is a limit to its utilisation with the availability of complementary capital. The study concluded that the small farmers, therefore, continue to adopt traditional methods of production which involves no new investment. The findings of this study are directly related with that low hill zone of Himachal Pradesh where traditional agriculture is still in operation.

Shashi (1977) carried out a study on the Gaddi tribes of Himachal Pradesh: a sociological study. This study was conducted in Bharmour tehsil of Chamba district to find out the occupational structure of the tribals. The study revealed that the main occupation of the tribal was agriculture, but they could not be considered good agriculturists, the reasons being the shortage of land and their migratory character. Authors also found out that spinning and weaving were also important occupations of the Gaddi tribes.

Directorate of Economics and Statistics (1975) conducted a socio-economic survey in the backward areas of Shimla district. The objective of the study was to analyse the level of socio-economic development in these areas. The study found that the average size of holding in this area was 1.5 hectare and an average farmer belonged to the small and marginal farmers' category. The study further revealed that all the sample households were under debt and 75 percent of the total loans were taken mainly for domestic consumption. About 93.25 per cent of the households had obtained loans from village moneylenders.

Bhati et al. (1971) carried out a study on the development of tribal development in Uttar Pradesh. The study found out that the tribal farmers in tribal areas were completely unresponsive to modern innovation in farming due to their economic backwardness. The authors concluded that very small area has been devoted under high yielding varieties of paddy and wheat. The study also revealed that
large farms are able to invest more on fertilizer and irrigation as compared to small farms and this created economic disparities among small and large farms.

It may be concluded that sustainability of agriculture can be reflected through the productivity of land yield and return from the various agricultural activities. The adoption of monoculture, specialized and high chemical input has led to severe environmental damage and resource degradation. Since sustainable agriculture requires the integration of economic, ecological and social components. There is a need of identification and evaluation of appropriate farming systems. New variety of seeds fertilizer, accredit to small and marginal farmers and judicial implementation of tenancy law and expansion off-season activities in rural area should be given emphasis for sustainable agricultural development.