CHAPTER 2

REVIEW OF LITERATURE

The review of related literature provides an overview of the work done on the concerned topic from the conceptual, methodological, and policy point of view. The different Government agencies as well as individual scholars have strongly recommended that diversification in agriculture is an essential prerequisite for the overall development of the region in general and upliftment of farmers in particular. The different scholars both at the National as well as State level have conducted a number of studies on diversification of agriculture. In order to have an idea about the nature and extent of agricultural diversification as well as about the implementation of the policies and programmes, a few important related studies are reviewed as under. This chapter has been divided into two sections. The studies conducted in other States have been reviewed in section 2.1, whereas section 2.2 deals with the review of studies conducted in Himachal Pradesh.

2.1 Review of the Related Studies Conducted in the States other than Himachal Pradesh:

Garg and Prasad (1974) conducted a study on comparative profitability of vegetables crops in the vicinity of Kanpur city. Their study revealed that vegetables farming yields higher returns per hectare in comparison to foodgrain crops. A highest per hectare return has been obtained from tomato. Comparing the economies of tomato with that of HYV wheat, it was found that net income was higher on tomato by one and half times that of wheat.

Verma and Pant (1978) assessed the potentialities of increasing farm income and employment through dairy development. The results of the study showed that the recent farmers who introduced dairy enterprises on their farms were required to make adjustment in their cropping pattern and divert about 19
percent of the total cropped area from foodgrain crops to fodder crops. Introduction of dairy on the arable farm proved to be most profitable proposition and increased farm income by more than 65.67 percent. The human labour requirement increased from 845 man- days in the existing plan to 1384 man- days in the optimum plan.

**Singh, Patel and Ahlawat (1979)** studied the integrated crop and dairy system of Punjab. This study of economic relationship between crop farming and dairying in developing areas showed optimal degree of complementary between the two enterprises on different farm sizes. The results of this study revealed that the number of animal increased with the farm size, but the number of animals per holding was low in cash crop areas than the traditional crop areas.

**Saini and Singh (1985)** conducted a study in order to find out the impact of agricultural diversification on income and employment by collecting data from a sample of 49 small farmers in Patiala district of Punjab State pertaining to the agricultural year 1978-79. This study concluded that the diversification of crop farming with high yielding seeds could play an important role increasing income and employment on these farmers.

**Singh and Sengar (1985)** studied the impact of agricultural diversification on income and employment of farmers in Kanpur district of Uttar Pradesh for the year 1983-84. This study concluded that the diversification of farm activities resulted an increase in income and employment of farmers but still there is much scope to raise their standard of living by further diversification of agriculture. But this study is based on a small sample size and the data collected pertains only to the year 1983-84. Therefore, the results of this study can neither be applied to the State as a whole nor the comparison can be made over a period of time in order to find out any change in the impact of agricultural diversification.
Kadian, Kausik and Kumar (1991) conducted a study in order to find out the impact of diversified farming system on the income and employment of rural poor by collecting the data from a sample of 140 farmers in Mahenderagrah and Kurukshetra districts of Haryana State. The economic analysis indicated that the relative share of wages and services has been reduced mainly due to the creation of additional employment in their fields. The diversification has also raised their standard of living.

Chowdry, Rao and Sree (1996) studied agricultural diversification of small farms of Nizamabad District in Andhra Pradesh in order to work out the contribution of different farm enterprises to the income of the selected farm families as well as to suggest measures for diversification of agriculture for increasing the income of small farmers. A sample of 30 small farm families has been selected and data for the agricultural year 1993-94 have been collected. The cost-benefit ratio has been used to compare the income from different farm enterprises. The results of this study concluded that the diversification of agriculture has increased the income and employment of the small farmers. But there are some constraints to the agricultural diversification such as inaccessibility to technological information, water shortage, capital scarcity, poor management, lack of inputs etc. The sample size of this study being very small, therefore, the results of this study cannot be applied to the district as well as to the State as a whole. The primary data for the study has been collected for the year 1993-94 only, therefore, the comparison of the impact of agricultural diversification over a period of time is not possible.

Gupta and Singh (1996) studied the diversification of cropping and production pattern in Haryana with a view to examine the diversification in cropping pattern as well as to work out the changes in the production pattern of principal crops during the period 1966-67 to 1993-94. The study is based on the secondary data collected from official sources. Simple tabular analysis has been used to study the changes in the cropping and production patterns. The results of the study revealed that with the increase in the area under irrigation,
the cropping and production pattern of crops had registered a substantial
change. This trend of diversification in both the cropping and production
pattern continued over the entire period of study.

Singh, Joshi and Singh (1996) studied the trends in the diversification
of agriculture in Punjab during the period 1965-66 to 1992-93 by using
secondary data. The study revealed that the diversification of Punjab
agriculture is positively affected by fertilizer consumption, tractor density and
net sown area per agriculture worker and inversely related to the farm size and
distance from market etc.

Khatkar, Singh and Tomar (1996) studied the diversification of
agriculture in Hisar district of Haryana in order to examine the relationship
between the crop diversification and selected economic variables; and to
identify the major obstacles in diversification of agriculture towards the
commercial enterprises. This study is based on primary data pertaining to year
1994-95, collected from 40 selected respondents of Hisar district. Simple
tabular analysis has been used to examine the relationship between crop
diversification and selected economic variables. This study concluded that farm
size, distance from market, number of family members engaged in agriculture
and irrigation intensity, are the major factors contributing positively and
significantly to crop diversification. Since this study pertains to the single year
1994-95, therefore, the comparison in the value of variables cannot be made.
Moreover due to the very small size of the sample, the results of this study
cannot be applied to the district as well as to the State as a whole.

Kushwaha and Singh (1996) studied the effects of diversification on
household economy of small farmers and wage labourers in the context of new
economic policy. The main objective of the study was to examine the effect of
diversified farming on income, employment and food nutrition at two points of
time i.e. 1984-85 and 1994-95. This study is based on intensive enquiry of 150
respondents from Chiraigaon block of Varanasi district in Uttar Pradesh. The
authors concluded that there was more opportunity of employment through
diversified farming for family and hired labour. The higher share of household income from orchards and vegetables come out due to more diversified farming which further resulted in higher use of nutritive food and marketable surplus for the selected households.

**Ajjan and Selvaraj (1996)** studied crop diversification in Tamil Nadu in order to examine the growth of potato and tea in terms of area, productivity and price in order to assess the impact of crop diversification as well as to study the impact of the scheme on income, employment and living conditions of small tea growers. A sample of 100 respondents has been selected at random for the purpose of this study. The secondary data on area and productivity of potato and tea and export price of tea have been collected from published sources. The study revealed that due to crop diversification, the tea generated a higher rate of return as compared to potato cultivation. The crop diversification also had positive effect on soil conservation and ecology of the area.

**Sharma, Chand and Vasisht (1996)** studied the role of agricultural diversification in the eradication of farm poverty of Tizara block in Alwar district of Rajasthan State. The study is based on primary data collected from a sample of 38 selected farmers for the agricultural year 1991-92. The Linear Programming technique has been used for working out the results of this study. This study revealed that the per capita income of small and marginal farmers has increased by adopting different farming systems like crop, dairy and goat enterprises.

**Senthilnathan and Amarnath (1996)** conducted an empirical investigation in order to identify extent of diversification on small farms in order to quantify the benefits of diversified production programme on small farms. A sample of 175 small farms has been selected for this study. The simple percentage and ratio method have been used to analyze the data. The results of this study revealed that the inclusion of milch animal in the farming system has generated non-farm employment as well as increased income on the farms. The addition of sheep rearing in the system also generated
supplementary income to small farms even with lower level of cropping intensity.

**Ram and Tripathy (1996)**\(^{15}\) studied the pattern of diversification in the cropping pattern of Orissa from 1980-81 to 1993-94. The data relating to the distribution of area under different crops grown during kharif and rabi seasons in the year 1980-81 and 1993-94 was obtained from the publication of Directorate of Agriculture and Food Production, Orissa. An in-depth analysis of the cropping pattern in Orissa revealed an overall departure from cereals. The trend of diversification swept favourably towards oil-seeds and pulses during the period 1980-81 to 1993-94. During kharif season, the cropping pattern has favoured oil seeds and pulses in general and til, groundnut, moong and bin in particular. During rabi season, crop diversification has favoured groundnut, mostly. However, the trend of cropping pattern moved favourably towards vegetable during kharif and rabi. The above changes in the cropping pattern have increased the income of households in the area under study.

**Patil (1996)**\(^{16}\) analyzed the diversification of cropping patterns in Karnataka during the post Green Revolution period. The diversification of cropping pattern has been worked out by calculating the annual growth rates of area, production and yield per hectare of principal crops. The study is based on secondary data for the period 1970-71 to 1993-94. The results of this study indicate that growth rates of area, and output of groundnut, sugarcane, sunflower and sesame has increased which clearly shows that agriculture in Karnataka is diversifying. The cultivation of cash crops like sugarcane, sunflower, and groundnut has increased. The development of marketing facilities, provision of storage and ware-housing and expansion of irrigation facilities have helped even the small farmers in commercializing their production and thereby increasing their income.

**Sharma, Sharma and Bala (1996)**\(^{17}\) studied the levels of diversification and factors affecting diversification; as well as the per capita expenditure on different groups of items and examines their relationship with
diversification groups in Kerala, Andhra Pradesh, Karnataka and Maharashtra. The data for this study has been collected from various secondary sources for the year 1980-81, 1986-87 and 1992-93. The diversification has been calculated through Herfindahl Index and regression analysis by using the secondary data. The results of this study indicate that percentage of area under cereals has been decreased over the decade. The diversification was found to be low in Kerala as indicated by comparatively high value of Herfindahl Index. The diversification was found to be high in Andhra Pradesh, Karnataka and Maharashtra. The factors affecting diversification indicated that size of holdings had positive relationship with diversification.

Lathar, Pandey and Goyal (1996) studied the prospects of enhancing the income of the marginal and small farmers through diversification of farming in Haryana. The study was mainly based on the data collected from 200 sample farmers selected randomly from three sub divisions of Sonepat for the year 1993-94. With the adoption of advanced production technology being followed by the top 10 percent of the progressive farmers for various crops and high value farm products which also included vegetable crops, mushroom, marigold, papaya and crossbred cows, the return over variable cost increased by 356 and 184 percent over the base period for marginal and small farms respectively. The availability of human labour was found to be surplus in almost all the months. The employment increased by 30 and 71 percent over the base period in the case of marginal and small farms respectively.

Sharma, Rao and Sharma (1996) studied diversifying cropping pattern and food security in order to examine the growth of production of different crops in Rajasthan. The data was collected for the years 1960-61 to 1993-94. This study revealed that cropping pattern is changing in favour of remunerative crops. Presently this was not affecting food security adversely as there was enough scope to increase the cropped area.

Arora and Srivastava (1996) studied diversification of cropping pattern and food grain mix in India, and its pace, magnitude and implications.
The analysis was based on secondary data collected for a period of 45 years i.e. from the years 1950-51 to 1994-95. The Herfindahl Index and simple linear regression method have been used for working out the results. The results of this study revealed that the area under the food-grains is considerably declining and the share of oil seeds, sugarcane, fruits and vegetables were found to be increasing. The potential of fruits, vegetables and spices for generating employment, enhancing farm income and earning foreign exchange was much higher than that of cereals. This tendency showed food security to poor via providing gainful employment and increasing their purchasing power.

Gauraha (1996)\textsuperscript{21} studied the impact of technological changes on the cropping pattern, farm investment and farm income distribution in village agriculture at two points of time viz; 1985-86 and 1995-96. This study has been conducted in Semartara village of Fingeshwar block of Raipur district in Madhya Pradesh. All the farm families who owned land in the village have been included in the study. The results of this study indicated a clear trend towards increased specialization and shift from low-income varieties to higher income varieties of paddy. Thus, the new technology is influencing the crop enterprise at the farm level towards more specialization than diversification. This increase in income occurred due to shift in cropping pattern to high income varieties of crops and increased use of inputs.

Saleth (1997)\textsuperscript{22} studied diversification strategy for small farmers in Tamil Nadu with a view to identify the economic and non-economic factors behind the crop diversification and live stock diversification; to assess the effects of diversification on overall performance of enterprise; to evaluate the occupational diversification of farm groups both in employment and income domains; and to indicate certain policy requirements for an effective diversification strategy for small farmers. Tiruchirpalli district of Tamil Nadu was selected for the study. A sample of 218 households was selected. Simple tabular analysis was used to examine the objectives of the study. The study concluded that income and employment of poor rural groups can be
considerably enhanced by changing the size and composition of livestock enterprises to favour income-wise more important dairy animals. The livestock sector holds the key for promoting greater employment and income diversification among the small farmers.

Bhal, Prasher and Mehta (1997) studied the diversification of Indian agriculture over the period 1970-71 to 1989-90, in order to examine the trends and extent of diversification, Herfindahl and Theil’s Entropy indices had been used. The results of this study indicate that in States like Bihar, Punjab, Haryana, Uttar Pradesh and West Bengal, specialization is taking place, while other States are experiencing diversification. The relationship of diversification with food-grains yield was found negative. The rainfall and average size holding are the important factors, which significantly reduced the level of diversification of agriculture.

Birthal (1997) studied the occupational diversification, income distribution and its implications for rural development. This study is based on primary data collected from 150 rural households in three villages of Muradabad district in Uttar Pradesh. The households were selected by using stratified random sampling and data pertained to the agricultural year 1991-92. The sample comprised of 50 landless, 75 marginal, 10 small, 10 medium and 5 large farms households. This study concluded that agriculture is the main occupation of majority of the rural population and accounts for about half of the total income. Animal husbandry is the next most important occupation in terms of its contribution to total income and is followed by wage labour. Land ownership is one of the most important determinants of occupational diversity. As the size of holdings increases, households specialize in agriculture with animal husbandry as subsidiary activities. The landless households have a more diversified earning pattern with wage employment as the main source of income and are followed by other non-farm activities like business, art crafts and salaries. Similarly increasing opportunities for employment in and outside
agriculture would have a much stronger and favourable impact on income distribution.

**Shyani and Pandya (1998)** studied the diversification of agriculture in Gujarat for the period 1960-61 to 1995-96. The main objective of the study was to examine the levels of crop diversification in different zones of Gujarat over a period of time. For empirical analysis of crop diversification level, the researchers have used Herfeindahl Index and Entropy Index methods. The study observed that farmers have shifted their cropping pattern from the subsistence crops to commercial crops. More diversification was noticed in the initial years of the study as compared to the terminal years.

**Singh, Sexana, Yadav and Chauhan (2001)** studied diversification of agriculture in district Farrukhabad of Uttar Pradesh. The analysis is based on data collected from a sample of 150 farmers selected from 15 villages in three blocks of Farrukhabad district. This study revealed that agricultural diversification through horticulture crops, vegetables and commercial crops has a huge potential for employment and income generation on different farms in the study area. The vegetable cultivation due to its labour intensive nature was more beneficial for marginal and smallholdings where family labour availability per unit of land was higher as compared to large farm holdings.

**Singh, Pandey and Tripathi (2001)** studied the changing scenario of rural employment in diversified Haryana agriculture based on secondary data for the years 1988-89 and 1998-99 collected from statistical abstracts of Haryana. The objectives of the study were to examine the pace of crop diversification across regions in Haryana, and to study the trends in crop wise levels of employment and wages in the State. The analysis of the data revealed the fact that various crops i.e. potato, sugarcane, cotton, wheat, rice, bajra and maize respectively had higher level of employment while moderate level of employment existed in pulses and oilseeds.

**Khatkar, Singh, and Tomar (2001)** studied status of diversification, wage rates and employment in agriculture in Haryana. The data has been
collected pertaining to pre-reform period 1976-77 and post reform period 1994-95 from two research bulletins of Department of Agricultural Economics, Cost of Cultivation Scheme Haryana Agriculture University, Hisar. It has been concluded in this study that diversification in terms of crop as well as occupation has increased in the post-reform period. The extent of crop diversification on the basis of different diversification measures was observed to be the highest on large farms mainly due to adequate availability of land and other resources. Similarly occupational diversification among small, medium, and large farmers has increased in the post-reform period. The wage rate of agricultural labourers increased manifold in post reform period over the pre-reform period.

Kalamkar (2003) conducted an empirical investigation during 1961-62 to 1997-98 in order to analyze agricultural growth and contribution of various components to the overall output growth of the Maharashtra State. In this study the diversified crops such as cereals, pulses, and other commercial crops were selected. Herfindahl and Antropy indices were applied for crop diversification. The study concluded that the growth in area of major crops in the state revealed a mixed trend. Except the traditional crops such as jowar bazra and wheat, all other crops recorded growth during the study period. Kalamkar further concluded that HYV / seeds, new techniques and chemical fertilizers should be more productive for crop diversification.

Brithal, Jha, Joshi & Singh (2006) conducted an empirical investigation during 1998 in order to find out the potential for crop diversification in north-eastern region of India. In this study they found that the demand for high value food product such as fruits and vegetables etc. has been increasing rapidly in the domestic as well as global markets. Thus the region has the potential to shift from the existing subsistence agriculture to a commercial one through agricultural diversification. Diversification led growth is expected to generate enormous income and employment opportunities for farmers especially small holders and rural labours. In this study they took
50,000 farm households spread over the country including the north eastern States. They examined the status of agricultural diversification, the participants of small holders in agricultural diversification, and the driving forces that enabled the products to harness the potential of high-value agriculture. This study concluded that the diversification toward high value crops has considerable potential to accelerate agricultural growth and augment income and employment opportunities for the small farmers. The region can emerge as an important centre of high-value agricultural products provided the lack of infrastructure for production, marketing, processing and other constraints are to be alleviated through appropriate policy and institutional arrangements.

Bhaumik (2007) studied agricultural diversification among the different categories of farmers in Hooghly and Cooch Behar districts of West Bengal. He took a sample of 600 households of all categories i.e. marginal, small, semi-medium and medium farmers. He concluded that one-third of the rural households were dependent exclusively on the farm sector for their livelihoods. Nearly 57 percent of incomes of the rural households were generated in the farm sector through agricultural diversification while 40 percent of the total employment was generated in this sector through agricultural diversification. It was also seen that the advanced agricultural systems created better employment opportunities also in the non-farm sector. Although all the categories of households attempted to diversify their employment and income portfolios, but the degree of diversification has been greater among those belonging to lower farm size groups. It was also observed that the extent of agricultural diversification increased with an increase in the size of holdings due the fact that households with more workers and workers of younger age tend to diversify more. Education has also been an important factor in agricultural diversification i.e. the inclination for agricultural diversification increased as the educational level improved. The availability of loans from the institutional agencies and ownership of some non-farm assets also encouraged agricultural diversification.
Chakrabati and Kundu (2009) conducted a survey on crop-diversification in three States i.e. West Bengal, Tamil Nadu and Punjab. They concluded that crop-diversification could be a socially beneficial when it is complemented by extensive infrastructural facilities, financial and technological support etc. especially for the localized marginal and small farmers. Furthermore, specific support to organize the marketing network is very crucial for a policy of crop-diversification among these farmers. For this, an appropriate institutional set-up should be organized so that crop-diversification may be increased among the farmers in these States.

Jodha (2009) conducted a study on mountain agriculture in order to find out the degree of agricultural diversification. In his study, he concluded that diversities of varying degrees and at different levels has been a dominant feaster of mountain agricultural diversification. Traditionally mountain farmers have been harnessing their gains through various spatial and temporal combination of crops and activities linked to livestock, farm forestry etc. looking to the emerging new market opportunities as well as new production and processing technologies, the options to enhance and harness the options through diversified farming and over all land use systems have increased significantly. The agricultural diversification can be increased more through appropriate policies and support systems.

2.2 Review of the Related Studies Conducted in Himachal Pradesh:

Nadda, Sharma, Bhaduaria and Swarup (1978) conducted a study in order to evaluate the farming system in hill areas of Himachal Pradesh by optimizing crop production pattern. The results of the study revealed that the existing cropping pattern was sub-optimal mainly in the low and mid hill zones, where diversification of agriculture was observed. The normative cropping pattern involved fewer crops, indicating a tendency towards specialization. Therefore, incentives should be devised for less’ paying minor crops, like pulses, barley and fodder etc. This study revealed a lot of scope for extending more credit in hill agriculture, particularly for irrigation facilities.
fertilizers and other purchased inputs. The observed value of marginal productivity of human labour indicates that there is surplus labour force in the hilly areas. The developmental efforts in these regions should be oriented towards agro-based industries so that the excess labour force in agriculture can be shifted to such industries. There is also a lot of scope for creating more off-farm opportunities.

Kanwar and Singh (1985) conducted a study in order to examine the degree of diversification in hill agriculture. The study is based on both primary and secondary data. The results of this study indicate that there is a direct relationship between the agricultural diversification and land holding size. It was also observed that diversification of agriculture has taken place only on the large and medium size of holdings. The Cobb–Douglas production function has been used to achieve the objectives of this study. The results of this study clearly indicate that availability of resources is a necessary condition for inducting agricultural diversification at the farm level, during the early seventies, the degree of crop diversification was very high in the districts falling in the mid and high-hill zones. In the low hill zone, the diversification was of medium and low level. The results of this study also show that only the large and medium farmers can diversify their agriculture more than the small and marginal farmers.

Thakur, Kapila, and Chander (1985) studied economics of vegetable production and diversification of farming in Saproon valley of district Solan in Himachal Pradesh with a view to work out the net income of major vegetables and other crops; and to study the credit requirements of vegetable growers for diversification of farm economy in order to attain manifold increase in income. The multi-stage random sampling technique had been used to select the sample units in this study. In all, 80 farmers were selected from the selected villages and the required primary data was collected from the sample farmers by survey method on the pre-tested schedule for the year 1983-84. The linear programming method was used to work out the
optimum farm plans and capital requirements of vegetable growers in the area. The results of this study revealed that most of the vegetables are grown as mixed or inter-cropped with maize, sugarcane and other crops thereby raising total production and income of farmers. The vegetable production provides gross income of above Rs.1.20 lakh per hectare per annum. The net returns from vegetables are 10 to 20 times higher than that of most of the principal field crops grown. The main limitation of the study is that the area of study was confined to few villages and therefore, the results cannot be made applicable to district as well as to the State as a whole.

Sharma (1985) studied the mixed farming on tribal farms of Bharmour Tehsil of Chamba District in Himachal Pradesh in order to workout the labour utilization for different categories of tribal farms; and to estimate the income levels for different categories of tribal farms under varying resource-restrictions, the Bharmour Tehsil in Himachal Pradesh was purposively selected. Ten percent of inhabited villages were randomly selected. The farmers were classified into two groups (i) those having shepherd and land, and (ii) those having land only. The linear programming technique has been used to find out the optimum combination of sheep, cows and crop farming. The integral programming was used to find out the values for sheep and cows. The result of this indicated that farm income increased on mixed farms under both the categories under study. With the adoption of modern technology, income disparities have been reduced in the area under study. This sample size of 10 percent of inhabited villages of such a small tehsil of interior district of Himachal Pradesh is a limiting factor to generalize the results of this study to the district as well as to the tribal areas of the State as a whole.

Chand (1986) conducted a study on diversification of agriculture in Himachal Pradesh and concluded that agricultural diversification is of complex nature in Himachal Pradesh due to variation in agro climatic conditions between different regions. Diversification has taken place at all levels, but appears to have benefited more the medium and large farmers in the districts
falling in the mid and high-hill zones. There is potential for the development of horticulture crops in lower hills also but it has remained untapped due to the lack of technical know-how among farmers. To the weaker sections land constitutes major constraint for increasing farm family income.

Swarup (1987)\(^{39}\) studied mixed farming system in Himachal Pradesh. It was pointed out that food grain accounts for 92 percent of the gross cropped area but the returns per unit of land under varying agro-climatic conditions in Himachal Pradesh is more in horticulture crops than food crops. This has resulted into shifting their land to horticulture enterprises. It was reported that 40 percent of area in temperate zone had shifted from field crops to fruit crops.

Bhatti and Singh (1988)\(^{40}\) conducted an empirical investigation of 150 farmers engaged in growing vegetables in Shimla, Solan and Sirmaur districts of Himachal Pradesh with a view to analyze the role of vegetable crops in increasing farm income and employment. They concluded that vegetable crops accounted for 29 percent of total cropped area and small and marginal farmers devoted relatively more area to vegetables. Nearly 20 percent of total household employment has been found to be generated by vegetable crops while cereal crops accounted for 6 percent of the total household employment. They also concluded that during the whole year 32 percent of total household income was generated through vegetable cultivation while the contribution of cereal crops to total household income has been nearly 10.54 percent. The net returns from vegetable crops have been found to be quite high as compared to cereal crops. They concluded that vegetable cultivation yields much higher returns per unit of labour and capital expenditure as compared to cereal crops.

Sharma, Oberoi and Moorti (1990)\(^{41}\) studied the diversification of agriculture in order to study the impact of diversification on the risk minimization and the maximization of the income of the farms. This study is confined to two major vegetable growing blocks, Nagrota Bagwan and Kangra, of Kangra district Himachal Pradesh. The study pertains to the agricultural year 1980-81 to 1966-87, consisting a sample of 150 vegetable farms. Two
stages random technique was used for obtaining sample and variation of standard deviation was used to obtain the objectives. The results of this study suggested that the vegetable plus dairy farming and poultry was the most appropriate choice for the farmers of the study area to increase their farm income. The pure vegetable farming has been found to be most risky and least remunerative. The authors concluded that the risk could be significantly curtailed and farm income could be increased if the farmers diversify their cropping pattern. The main limitation of this study is that it was confined only to the cultivation of vegetable and non-farm activities like poultry and dairy.

Kumar (1990)\(^4\) compared net returns from various field crops in Himachal Pradesh and concluded that net returns were highest in tomato followed by cauliflower, potato, peas, paddy and wheat. Vegetables gave more returns as compared to cereal crops and were observed to be more labour intensive as well as capital intensive. Further, it was concluded that in case of vegetable, there was direct relationship between size of holdings and net returns whereas inverse relationship has been observed in cereal crops.

Sharma, Sharma and Vaidya (1991)\(^4\) studied hill farming system in Himachal Pradesh in order to pinpoint the regions where the potentials of land have not been utilized after the adoption of Green Revolution and which influenced the farmers to adopt diversification in the cropping patterns. With a view to know the potentials of these regions, cost and returns were worked out of 50 beneficiaries in the sample cluster of villages in district Solan of Himachal Pradesh. It was found that per hectare net return has increased and the farmers have shifted their area from cereals to off-season vegetables, which fetch them higher returns.

Sharma, Bhatti and Singh (1991)\(^4\) studied emerging farming systems in Himachal Pradesh with a view to identify the farming systems followed in different agro climatic zones of Himachal Pradesh as well as and to examine the changes in the farming systems in recent past alongwith the strength and direction of trends now in process and their specific characteristics and features.
calling for adjustments in policy response. Four agro- climatic zones i.e. low, mid, high and high temperate dry zones (each having three villages) were selected. A sample of 75 farm households representing different size groups of holdings were randomly selected for detailed study in each zone. The required data for the year 1987-88 were collected through structural schedules by personal interview method. The study revealed that due to emergence of specialized commercial farming based on fruits and vegetable production, the income and employment opportunities has increased.

Bhatti (1992) found that there is a great diversity in mountain farming system in different zones of Himachal Pradesh which have emerged due to the peculiar agro-climatic environment. According to the study there is great diversity in level and composition of rural household income in different zones of Himachal Pradesh. Although family size and farm size has not differed much in different agro-climatic zones but there was a wide variation in farm household income due to qualitative differences in farming systems.

Bhatti (1992) pointed out that farming system in Himachal Pradesh (i.e. Kinnaur and Lahaul Spiti farms) follow diversified farming system (including crops, live-stocks and off-farm activities). The primary data has been collected for attaining the results of the study. The per household annual net income from these activities were observed to be at Rs.30,000 in Lahaul and Rs.20,000 in Kinnaur. Further per household annual employment generated were 552 and 402 man days in Kinnaur and Lahaul blocks, respectively.

Saraswat (1996) studied diversification pattern and farming system in Kot Village in Hamirpur district Himachal Pradesh. The data has been collected from a sample for the period 1959-60 to 1989-90. The Census method adopted to obtain the required information. The results show that the change in the cropping pattern in the village was due to the lack of irrigation facilities. The diversification in agriculture took place due to increasing trend of agricultural productivity because of technical changes and use of high yielding variety seeds, fertilizers, pesticides and improved methods of cultivation in
agriculture. The area of study related to one village, therefore this study cannot be made applicable to the district as well as the State as a whole.

Raman and Sharda (1996) studied the diversification of agriculture in order to study the extent of diversification of agriculture as well as the factors responsible for it in Himachal Pradesh. This study is based on secondary data. The year 1973-74 has been taken as the base year while 1992-93 was considered as terminal year to work out the pace and direction of diversification of agriculture in Himachal Pradesh. The cost-benefit ratio was used to compare the returns from traditional crops with commercial crops like fruits and vegetables. The study revealed that agriculture has diversified in favour of fruits and vegetables in the State. Out of 12 districts, 3 districts, that i.e Bilaspur, Hamirpur and Una lying in the low-hill zone have not diversified the agriculture as much as five districts i.e. Shimla, Kullu, Solan, Kinnaur, Lahaul and Spiti lying in the mid and high- hill zones have agrarian diversification on account of agro climatic conditions favourable for fruits and off- seasonal vegetables crops.

Ramesh Chand (1996) has studied the agricultural diversification alongwith farm and non-farm employment in Himachal Pradesh. This study examined the scope for increasing the income and employment opportunities in the various categories of land holdings by diversification through vegetable cultivation and the scope for fruit cultivation in mid hill zone. This study is based on primary as well as secondary data. The grass-root level information have been collected covering 298 farm households in mid-hill-zone of Himachal Pradesh. The study concluded that agricultural diversification through vegetable crops has a huge potential for employment and income generation in the Western Himalayan region. The infrastructure like access to motorable roads, markets and irrigation determine the extent, success and profitability of diversification through high paying crops like seasonal vegetables and horticultural crops.
Ramesh (1996) studied the agricultural diversification through high value crops in Himachal Pradesh in order to examine the scope for raising income and employment in various size of land holdings by diversification through off season vegetable cultivation in order to examine the scope for fruit cultivation in the study area; and to analyze the impact of infrastructural, institutional and socio-economic factors on crop diversification through vegetable crops. The sample size of 298 farm households have been selected from four panchayats in Solan block of Solan district. The data was collected from November, 1992 to October, 1993 and from December, 1993 to February, 1994, Simple tabular analysis was used to study the changes in income and employment due to diversification in agriculture. This study concluded that diversification has changed the pattern of cropping and increased the level of income and employment of the farmers.

Saini, Sharma and Singh (1996) conducted an empirical investigation in order to study the impact of agricultural diversification on income, employment and credit needs of the small farmers in Kangra district of Himachal Pradesh. A sample of 80 households had been selected from eight villages in Nurpur and Nagrota Bagwan blocks of Kangra district. The data collection was done by survey method on specially designed schedule pertaining to the agricultural year 1991-92. The linear programming model has been used to work out the results of this study. The results of this study revealed that diversification of farming system with commercial enterprises such as high yielding milch animals, poultry birds, bee keeping, floriculture etc. has increased farm income and also increased the employment opportunities to the small farmers.

Kumar, Sharma and Vashist (2002) conducted an empirical investigation during 2001 with a view to investigate the extent of profitability and risk in pulses and oil seeds cereals and vegetables in the low hill zone of Himachal Pradesh. A total sample of 150 farms was selected from two blocks i.e. Nagrota Bagwan and Kangra of Kangra district. The objectives of this
study were (i) maximization of expected gross margin and (ii) minimization of risk associated with expected gross margin. In the investigation, the initial level of gross margin was fixed at the subsistence level of a farm family returns. The increment in gross margin was fixed in such a way that four-five optimum farm plans were obtained. The distinction of percent area and gross margin under different crop groups revealed that in the case of vegetables and miscellaneous crops the percentage of gross margin is more than the percentage of area, thereby showing their high profitability. In case of cereals, pulses and oilseeds the percentage of gross margin is less than percentage area allocated to them, thereby revealing the low profitability. This study suggested that vegetables is the most appropriate choice for the farmers of the study area where by they could increase their farm income by as much as 47.76 percent of the existing farm income. The coarse cereals, pulses and oil seeds having low profitability did not enter into programming. However, the area under cereals for subsistence level was kept as a constraint to have area under them in optimum cropping pattern. Therefore, the study suggested that if we have to retain these eco-friendly crops to promote human health, the productivity and profitability has to be further enhanced through research efforts. The study clearly indicates the fact that risk could be notably decreased if the farmers diversify their cropping pattern.

Sharma (2005) conducted a the study to understand the pace and pattern of regional agricultural development and to study the temporal changes in the process of agricultural diversification in terms of changing share of crop production, horticultural crops and changes in the cropping pattern of high value crops, to estimate and compare the costs and returns of high value cash crops and to identify the ecological factors both at micro and macro level, which facilitated the whole process of change. A total sample of 225 farm households, 75 each from three development blocks, namely the Theog in Shimla, Sangrah in Sirmour and Seraj in Mandi districts of Himachal Pradesh had been selected. The study was based on Herfindahl Index during 2001-02. This study concluded that agriculture in Himachal Pradesh recorded fairly high
growth rate during the past three decades. The horticultural sector registered a significant increase in terms of area and production of fruits. Further, the status of the agriculture over the years had been diversified towards fruits and off-season vegetables like peas, potato, cabbage, cauliflower etc. The household data showed the net return was very high from these off-season vegetables. This study further suggested that more potential for crop diversification can be traced out if the State government creates the essential facilities like transport, health and education. Except these facilities, the marketing and production problems of the farmers should also be solved.

Kumar and Kumar (2005) conducted an empirical investigation during 2001-02 in order to ascertain the resource use efficiency as well as to workout the profitability of the selected foodgrain crops (i.e. maize, wheat and rice) in the low-hill zone of Himachal Pradesh. A total sample of 200 marginal, small and medium farmers has been selected from two block i.e. Ghumarwin and Una each falling in Bilaspur and Una district respectively. By applying Cobb-Douglas production function, he concluded that more use of HYV seeds, insecticides, pesticides and mechanization of agricultural system, more irrigation facilities and increased credit facilities will increase the agricultural production. The consolidation of holdings and redistribution of land in favour of small and marginal farmers will further enhance the agriculture productivity. This study deals with the returns to scale of few food grains crops i.e. maize, wheat and rice with a view to find out the potential, for crop diversification. Returns to scale in vegetables and some more crops should have also been included in the study.

Pathania and Vashist (2007) conducted an empirical study during 1995 - 1996 in order to find out the problems of marginal and small farmers as well as the solution for their problems. They took the sample of 40 marginal and small size of holdings in Nagrota block of Kangra district of Himachal Pradesh. The findings of this study have clearly brought out that the large holding have decreased while small and marginal holdings has increased over
the years in the State resulting into higher human labour pressure on agriculture. This trend not only calls for reduction in population dependent on agriculture but also changes in the subsistence agricultural system. This study has concluded that the farmers shifted from cereals to vegetables have earned more income and this has also provided more employment to the people. These farmers can become economically more viable if they follow vegetable farming while the government arranges necessary facilities like irrigation, marketing and infrastructure. The crop diversification is the best option for marginal and small farmers because they cannot meet out the minimum family requirements and are not economically viable where they follow the traditional food-grain agricultural cropping system. Therefore, they need to diversify the cropping system with inclusion of vegetable and other commercial crops.

Sharma (2011) conducted an empirical study during 2007-08 in order to find out the nature of agricultural diversification. He took the sample of 210 households, 70 each from three development blocks namely, Kandaghat in district Solan, Banjar in district Kullu and Salooni in district Chamba of Himachal Pradesh. His findings revealed that agriculture in the State has recorded a growth of around three percent per annum during the past two and half decades since 1980-81. The ongoing process of crop diversification in the State has become evident from rising proportion of gross cropped area under fruit and vegetable crops. This has also been manifested in increasing the contribution of these crops towards gross value of output originating in agriculture. The household survey data from three different blocks of the State further showed that even the marginal households, owning up to half a hectare of land, have devoted nearly three- fifth of their gross cropped area for the cultivation of these crops. The cultivation of high value crops yields very high net returns and has made a significant impact on the income and employment levels of all the categories of cultivating households. He further concluded that explicit consideration of mountain specificities, namely, inaccessibility, fragility, niche and human adaption mechanism in formulating and
implementing development strategies was the single most important factor that set into the whole process of agricultural diversification.

Kumar (2011) studied the impact of agricultural diversification on food and non-food grains during 2007-08. His findings revealed that food grain crops which accounted for about 85 percent of the total cropped area in the State witnessed a small decline of about 4 percent due to agricultural diversification during this period. On the other hand there has been 6.45 percent increase in the total cropped area in case of vegetables. The State has emerged as a model of agricultural diversification towards high-value cash crops, mainly off-season vegetables. Earlier, the production of these high value vegetable crops was confined to selected mid and high-hill zones. But now, the remunerative returns from these off-season vegetables have allured the farmers in low-hill zone also.
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