CHAPTER 8
Summary, Conclusions and Suggestions

Agriculture is the backbone of almost all the developing countries like India. Agriculture plays a vital role in the process of economic development of a country by generating surplus to make it available for the non-agriculturalists at the affordable prices on the one hand and providing funds for investment in the other sectors of the economy on the other. It is desirable in an agriculturally dominant economy like India or micro level like the State of Himachal Pradesh, that the productivity of various crops i.e. foodgrain, vegetables, horticultural and floricultural crops should be increased for the well being of the farmers in particular and the society as a whole. The development history of economic growth of the developed countries clearly indicates that generation of agricultural surplus in the agricultural sector of an economy is a pre-condition for economic development of the economy. Since independence the development of agricultural, industrial and service sectors of Indian economy has been the main aim of the economic planning and policies. In the process of economic development these sectors of the economy got expanded and brought structural changes and contributed increasing shares in the Gross National Product (GNP) of the country. It is imperative to formulate and implement proper policy regarding land reforms in order to promote agricultural diversification in order to enhance the State Domestic Product (SDP) in particular and national income of the country in general.

Agriculture being the largest sector of the economy and main occupation of the people in Himachal Pradesh. It provides direct employment to about 71 percent of the working population and contributes 22 percent of State Domestic Product. The food grain production forms the main component of agricultural sector in Himachal Pradesh. Wheat and maize are the two most important food grain crops grown in the State, which accounted for about 69.74 percent of the total cropped area while total food grain crops production occupied about 85.97
percent of cropped area. The average yields of major foodgrain crops are lower than the national average. This clearly demonstrates the low impact of Green Revolution and new technology in the State. Hence the food grain production has remained a subsistence pursuit rather than a commercial venture. The diverse climatic conditions are congenial for the production of variety of vegetables, horticultural, floricultural products as well as for other farm products like mushroom and livestock production.

The vegetables, horticultural and floricultural products produced in hills have a special comparative advantage, as these products are of better quality and ready for market, when these are not produced in the plains. Consequently off-season vegetables produced in the hills fetch higher prices. Therefore the vegetable farming has become highly remunerative and brings more area under cultivation in hills and attractive venture for the farmers. There is limited scope to bring more area under cultivation in hills, the vegetable farming offers great scope for multiple cropping and thus ensures economic viability of even marginal and small farmers which account for about 82 percent of the total holdings in Himachal Pradesh. In the mid-hill zone, Solan followed by Mandi are the vegetable growing districts in Himachal Pradesh, as the agro-climatic conditions are favourable for the vegetable, horticultural and floricultural production in these districts.

A number of studies conducted in Himachal Pradesh as well as in the other States of the country have been reviewed critically from the conceptual and methodological point of view in chapter II. It has been noticed that all these studies suffer from one or the limitations. In some of the studies only the agricultural diversification has been studied in foodgrain crops, in some studies foodgrain and vegetable crops and in other, very few study reference have been made to horticultural crops, but none of the study had analyzed the production, productivity and return to scale with reference to the floricultural products. Most of the studies have been explained logically and some have been explained by using the secondary data. Keeping in view the limitations in the
existing literature, an attempt has been made in the study to make this piece of work more realistic from the conceptual and methodological point of view. Both the secondary and primary data has been used to achieve the objective of this study. The agricultural diversification has been studied in wide perspective in the mid-hill zone of the State by taking into account foodgrain crops, vegetables, horticultural and floricultural crops. The quantitative results have been worked out by using the statistical tools like Cobb-Douglas Production function in order to work out the returns to scale and Herfindahl Index with a view to estimate the nature and extent of agricultural diversification. This study will prove quite helpful to farmers of the mid-hill zone of the State of Himachal Pradesh in order to make a choice for cultivating the more remunerative crops in order to increase their household income and thereby their levels of income.

A large number of studies have been conducted both by the Government agencies as well as by the individual scholars to work out the returns to scale either from food grain crops or other field crops, both at the national as well as State levels. But a very few attempts have been made in the State of Himachal Pradesh to work out the comparative net returns from foodgrain crops along with vegetable, horticultural and floricultural crops. Therefore, the present study has been undertaken to work out the returns to scale from foodgrain crops as well as from the cultivation of vegetable, horticultural and floricultural products in the mid-hill zone of Solan and Mandi districts of Himachal Pradesh. This study will prove quite helpful to the farmers to plan their production strategies through agricultural diversification for the production of profitable commercial crops. No such detailed comparative analysis has so far been conducted in the State of Himachal Pradesh. The specific objectives of the present study are spelled out as under:
1. To study the changes in the cropping pattern, land use pattern, production and productivity in the study area.
2. To work out the returns to scale in both foodgrain and non-foodgrain crops by size, class of holding.
3. To study the importance of livestock and horticultural activities on the household income and employment.
4. To study the impact of diversification on the income and employment of the selected households.
5. To analyze the factors responsible for the agricultural diversification in the study area.
6. To pin point the problems faced by the households and to explore the possibilities of agricultural diversification in the study area.

There are three zones in Himachal Pradesh viz. low -hill, mid- hill and high- hill zone. Out of these three zones, mid- hill zone has been selected for empirical investigation due to the reason that the topography, climate, soil, rainfall, cropping pattern etc. bear similarities in some areas to the low- hill zone and in other areas to the high- hill zones of the State. Moreover, agricultural diversification has taken place to a large extent in this zone. The mid- hill zone falls in the height between 800- 1600 meters and includes parts of Solan, Sirmour, Shimla, Kullu, Bilaspur, Mandi and Chamba districts of the State. The Solan and Mandi districts of Himachal Pradesh has been selected purposely due to the reason that in these districts the farmers grow food grain crops, vegetables, horticultural as well as the floricultural crops. A list of development blocks falling in the Solan and Mandi districts of the State has been arranged in an ascending order on the basis of their respective population and three blocks (one block in Solan and two blocks in Mandi districts) have been selected randomly. At the second stage a list of panchayats in each of the selected block has been arranged in an ascending order on the basis of their respective population and three panchayats in each of the block have been
selected randomly. At the third stage a list of villages in all the selected panchayats has been arranged in an ascending order on the basis of their respective population and three villages in each of the selected panchyat has been selected randomly. Finally, a list of households in all the selected villages has been obtained and after arranging these households in an ascending order on the basis of their respective size of holdings they have been classified into marginal farmers (less than 1 hectare), small farmers (1-2 hectares), semi-medium farmers (2-4 hectares), medium farmers 4-10 hectares) and large farmers (more than 10 hectares). A sample of 298 households in proportion to the total number of households falling in each holding group has been selected randomly, out of which 150, 66, 54 and 28 households fall on the marginal, small, semi-medium and medium size of holding groups respectively. Due to the hilly topography, majority of the size of holdings are small in size hence no large size of holdings with more than 10 hectares falls in the present sample.

The study is based on both primary and secondary data. The age and sex-wise household information, their land holdings, cropping pattern, (both foodgrains and non-foodgrains production) livestock, household income, employment and assets, prices of inputs and output have been collected with the help of schedule by conducting personal interview during the year 2009-10.

The Cobb-Douglas production function has been applied to study the elasticity of production of factor inputs and compute returns to scale of food grain, vegetables, horticultural and floricultural crops. The specification of the Cobb-Douglas Production function has been explained below:

\[
Y = A . X_1 X_2 X_3 X_4 X_5 X_6 \quad \text{where}
\]

\[
Y = \text{Value of output (Rupees)}
\]

\[
A = \text{Constant}
\]

\[
b_1 \text{ to } b_6 = \text{Elasticity co-efficient of respective inputs.}
\]

\[
X_1 = \text{Land (Hectare)}
\]

\[
X_2 = \text{Human Labour (man days)}
\]
The log linear transformation of the Cobb-Douglas function is as follows: -

$$\text{Log } Y = \text{Log } a + b_1 \text{ Log } X_1 + b_2 \text{ Log } X_2 + b_3 \text{ Log } X_3 + b_4 \text{ Log } X_4 + b_5 \text{ Log } X_5 + b_6 \text{ Log } X_6$$

The Herfindahl Index method is commonly used to study the extent of agricultural diversification and has been used in the present study. The specification of this method has been explained below: -

$$H = \sum_{i=1}^{N} P_i^2$$

Where $H$ = Herfindahl index

$$P_i = \frac{A_i}{\sum_{i=1}^{N} A_i}$$

In which $A_i$ = Area under ith crop (hectare),

$$\sum_{i=1}^{N} A_i = \text{Total cropped area (hectare)}$$

$$i = 1, 2, 3 \ldots \ldots n \text{ (Number of crops)}$$

$$N = \text{Total number of crops}$$

The value of Herfindahl index ($H$) varies between zero to one with the increase in diversification, the Herfindahl index would decrease. This index takes a value one when there is no diversification and when there is a complete
specialization it approaches to zero. The value of Herfindahl index has an inverse relationship with the levels of diversification.

The analysis of the socio-economic profile of the sample households presented in Table 5.1 reveals that out of total population of 1954 persons, 1002 are males and 952 are females. The age wise composition of the sample population consists of 538 infants less than 9 years of age, 239 fall in the age group of 9-15 years, 979 persons fall in the age group of 15-59 years, 76 persons fall in the age group of 59-65 years and 122 fall in the age group of above 65 years. Due to differences in the working capacity of the population falling in different age groups, the ‘Standard Man Days’ have been calculated by attaching proper co-efficient of efficiency, which is presented in the Table 5.2. The infants below 9 years of age and the old persons above 65 years of age are not contributing significantly in the household activities. Therefore, these infants and old persons have not been included in the household family labour force. Table 5.2 shows that 1015 total ‘Standard Man Days’ are available in the sample as whole, out of which 439.50, 237.50, 221.00 and 117.00 Standard Man Days fall on the marginal, small, semi-medium and medium size of holdings groups respectively.

In the present empirical study, the total number of households, total family members, average size of family, percentage of family work force, percentage of dependents, total standard mandays and household per day standard mandays among the sample households have been presented in Table 5.3. This table clearly shows that average family size on the marginal, small, semi-medium and medium size of holdings has been worked out 5.43, 6.88, 7.96 and 9.14 respectively and for all holdings together, the average size of family come out 6.56 per thousand. The percentage of family work force has been worked out 68.30, 66.52, 64.88 and 61.33 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all the holdings groups together, the percentage of labour force has been worked out 66.22 percent. The percentage of dependents thus come out 31.70, 33.48, 35.12
and 38.67 percent on the marginal, small, semi-medium and medium holdings respectively, while among all the holdings together, this percentage come out 33.78 percent. Among all the holdings together per day availability of ‘Standard Man days’ has been worked out 3.41 ‘Standard Man days’, whereas on the marginal, small, semi-medium and medium holdings, the per day availability of ‘Standard Man days’ has been worked out 2.93, 3.60, 4.09 and 4.18 respectively.

The literacy percentage among the sample households has been presented in Table 5.3. This Table depicts that 77.58 percent persons of the total sample population are literate. On the marginal, small, semi-medium and medium size of holding groups, this percentage has been worked out 71.87, 76.87, 83.25 and 87.50 respectively. This table further shows that literacy percentage is higher among the semi-medium and medium holdings mainly because of the fact that these households has sound and regular sources of household income and can afford investment on the education of their wards. Contrary to it, the households falling on the smaller holdings, due to their un-economic size of holdings, lack of gainful employment opportunities and thereby meagre household income cannot afford to bear the expenses of education of their children i.e. mainly for higher education. Further whatever educational facilities Government has provided in the study area are availed by the poor households mainly up to the primary or middle level by getting assistance from the Government in the form of fee concessions, free books and dresses etc. This Table further shows an increasing tendency in literacy percentage with an increase in the size of holdings among the sample households.

The occupation of the sample households have been classified into different categories i.e. agriculture, services, business, household industries, wage work and religious work before and after agriculture diversification. The data related to occupational pattern of different categories of households before agricultural diversification under study have been presented in Table 5.5. This
table shows that before agricultural diversification 32.21 percent households were engaged in agriculture and 37.92 percent were engaged in services. Among the Marginal, small, semi-medium and medium size of holdings 28.00, 30.30, 40.74 and 42.86 percent were engaged in agriculture respectively while 33.33, 34.85, 48.15 and 50.00 percent households were engaged in services respectively. On the hand, 26.70, 22.73 and 3.70 percent of marginal, small and semi-medium size of holdings were engaged in wage work respectively. Taking all groups of holdings together, 19.13 percent of the households were engaged in wage work. Taking business activities, this percentage come out 2.67, 4.54, 5.55 and 7.14 percent on the marginal, small, semi-medium and medium holdings respectively. In case of all holdings, 4.03 percent were engaged in business activities. In case of household industries, only 6.67, 4.54 and 1.85 percent of marginal, small and semi-medium holdings were engaged. For all holdings together, the percentage in household industries was 4.70 percent. In religious work, only marginal and small holdings are engaged and this percentage come out 2.67 and 3.03 percent on the marginal and small farmers respectively. Taking all groups together, 2.01 percent of the households were engaged in religious work. The occupational pattern of different categories of households after agriculture diversification under study has been presented in Table 5.6. This Table shows that now the larger percentage of the sample households are engaged in agricultural activities such as food grains, vegetables, horticultural and floricultural activities, nearly 43.33, 48.50, 68.52 and 71.43 percent of marginal, small, semi-medium and medium farmers are engaged in agricultural activities respectively. For all holdings it has been worked out 51.68 percent. On the other hand due to increase in agricultural income of the sample households, the households who were earlier working in the private contractual jobs are now working in the agricultural sector, as a result the percentage of sample households in services has been reduced and worked out 30.67, 30.30, 24.07 and 17.86 percent on the marginal, small, semi-medium and medium holdings respectively. In case of all holdings this percentage has been worked out 28.19 percent. In business
activities, there has been a slight increase due to increase in the agricultural income and nearly 4.00, 6.06, 7.41 and 10.71 percent of marginal, small, semi-medium and medium holdings are engaged in business respectively. For all holdings together, this percentage has been worked out 5.70 percent. After agricultural diversification, about 3.35 percent of all holdings have been engaged in household industries which consists of mainly the marginal and small holdings which accounts for 5.33 and 3.03 percent respectively.

Wage work being one of the important source of income particularly for marginal and small holdings before agricultural diversification, has now shown decline and shift to their own work in agricultural activities. The percentage in wage work has been worked out 15.34 and 12.11 percent on the marginal and small holdings respectively while semi-medium and medium holdings are not engaged in wage work due to regular gainful employment in agriculture. Taking religious activities, now only marginal holdings have been engaged and this percentage has been worked out 1.33 percent. The impact of agricultural diversification on the sample household occupational pattern in the study area has been shown in Table 5.7. This Table shows that after agricultural diversification the percentage of households in agricultural activities has increased by 15.33, 18.18, 27.78 and 28.57 percent on the marginal, small, semi-medium holdings respectively, whereas among all holdings together this percentage has been worked out 19.46 percent. In case of services, the households who were engaged in private jobs are now engaged in their own agricultural activities due to significant increase in their income after agricultural diversification. Thus, this percentage has decreased by 2.67, 4.54, 24.07 and 32.14 percent on the marginal, small, semi-medium holdings respectively, whereas among all holdings together, this percentage has been reduced by 9.73 percent. After agricultural diversification, there has been an increase in agricultural income which resulted in a minor increase in the business activities by 1.33, 1.51, 1.85 and 3.57 percent on the marginal, small, semi-medium and medium holdings respectively, whereas this percentage has been worked out 1.68 on all holdings together. In household industries, there
has been slight decrease in the percentage of marginal, small and semi-
medium holdings by 1.33, 1.51 and 1.85 percent respectively, but this
percentage has been reduced by 1.34 percent on all holdings together. On the
other hand, due to agricultural diversification the percentage share of wage
work activities among the sample households has been reduced by 11.30, 10.61
and 3.70 on the marginal, small, and semi-medium holdings respectively,
whereas among all the holdings together, this percentage has reduced by 8.72
percent. Similarly, the percentage of religious work activities have decreased
by 1.33 and 3.03 percent on the marginal and small holdings respectively and
after agricultural diversification none of the semi-medium and medium
holdings are engaged in this activity. Thus, this Table clearly shows the impact
of agricultural diversification on the occupational pattern of the sample
households.

The land use pattern of the sample households has been presented in
Table 5.8. This Table clearly reveals that before agricultural diversification on
an average 82.14 percent of the total area has been cultivated on the marginal
size of holdings. On small, semi-medium and medium size of holdings this
percentage have been worked out 71.43, 74.90 and 71.40 percent respectively,
whereas among all the size of holdings together, this percentage come out 74.17 percent. The percentage of leased-in land area has been worked out 1.79
and 3.57 percent on marginal and small size of holdings respectively. Among
all size of holdings together, the percentage of leased-in land area come out 1.32 percent. The percentage of leased-out land area has been calculated 1.17
and 2.85 percent on semi-medium and medium size of holdings respectively,
whereas among all size of holdings together this percentage come out 1.32 percent. On the other hand, total land area cultivated have been worked out to 83.93, 75.00, 73.73 and 68.32 on the marginal, small, semi-medium and
medium size of holdings respectively. Taking together all size of holdings, this
percentage come out 74.17 percent. In case of uncultivated land area or ghasni
before agricultural diversification, the percentage has been calculated 16.07,
25.00, 26.27 and 31.48 percent on the marginal, small, semi-medium and
medium size of holdings respectively, whereas among all the size of holdings together, this percentage come out 25.83 percent. This Table clearly shows that before agriculture diversification only semi- medium and medium size of holdings has leased-out their land.

The rural economy of mid-hill zone area of the State has been dominated by the subsistence production of traditional crops till some fruits, vegetables and horticultural crops appeared in the cropping pattern. The change in cropping pattern has been the most important source of growth of output of crop sector in the study area. Now the sample households have changed the land use pattern from traditional foodgrain crops to vegetables, horticultural and floricultural products, as a result there has been increase in the cultivated land area after agricultural diversification. The Table 5.9 reveals that the percentage of cultivated land area has increased to 84.75, 76.71, 83.53 and 80.16 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all size of holdings together, this percentage come out to 81.29 percent. On the other hand there has been a decrease in the uncultivated land area due to agricultural diversification, this percentage has been worked out 8.47, 15.75, 17.65 and 19.05 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all size of holdings this percentage come out 16.13 percent. The percentage of leased-in land area has been increased for all size of holdings and this has been out 6.78, 7.54, 1.57 and 3.57 percent on the marginal, small, semi-medium and medium size of holdings respectively and among all size of holdings together, this percentage come out to 4.52 percent. The percentage of leased-out land area has been increased which come out 2.75 and 2.78 percent on the semi-medium and medium size of holdings respectively, whereas among all size of holdings together this percentage has been worked out 1.94 percent. There has also been an increase in the total land area sown due to increase in the leased-in land area after agricultural diversification. About, 91.53, 84.25, 82.35 and 80.95 percent land sown area has been worked out on the marginal, small, semi-medium and medium size of
holdings respectively, whereas this percentage among all size of holdings together, this percentage come out 83.97 percent. Table 5.10 shows the significant impact of agricultural diversification on the land use pattern among the sample households. The percentage of owned cultivated land area has increased by 7.14, 8.57, 8.63 and 11.73 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all the size of holdings together, this percentage has been worked out to 9.27 percent. On the other hand, with the increase in the demand of land for cultivation, the share of owned uncultivated land area has decreased by 7.14, 8.57, 8.63 and 11.73 percent respectively, whereas among all the size of holdings together, this percentage has been worked out to 9.27 percent. The increase in the share of owned cultivated land area is exactly equal to the decrease in the share of owned uncultivated land area. There has been no change in the total owned land area of the sample households. The land area shifted from uncultivated land has been used for the cultivation of foodgrains, vegetables, horticultural and floricultural crops etc. after agricultural diversification. The leased-in land area has increased by 5.36, 4.28, 1.57, and 3.7 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all size of holdings together, this percentage come out to 3.31 percent. The percentage of leased-out land area has been worked out 1.57 percent on the semi-medium size of holdings while other size of holdings have not leased-out their land. The total operated land area has been increased by 5.36, 4.28, 1.57 and 3.70 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage has been worked out 1.57 percent among all the size of holdings together. The total cultivated land area has increased by 12.50, 12.85, 13.46 and 15.43 percent on marginal, small, semi-medium and medium size of holdings respectively. This percentage among all size of holdings together has been worked out 11.92 percent. Thus, this Table clearly shows the increase in total owned cultivated land area as well as increase in the total area sown among the sample households after agricultural diversification in the study area.
There is always increasing pressure on land due to increasing population and therefore, this resource has to be used judiciously. The gross cropped area includes net sown area and area sown more than once in a year. The cropping intensity on the other hand is a ratio of total cropped area to net area sown. The higher intensity of cropping is an indicator of the intensive use of the available land resource for cultivation. Due to peculiar agro-climatic conditions, difficult hilly terrains and scattered type of land holdings, the extensive cultivation in Himachal Pradesh is basically ruled out. Therefore, in order to obtain increased output, the introduction of intensive method of cropping is practised for overall economic development. Table 5.11 indicates the total owned area, area sown more than once, net area sown, gross cropped area and cropping intensity before agricultural diversification. Among all the size of holdings, the average net area sown has been worked out 1.79 hectares, out of which 1.12 hectares has been cropped more than once. This indicates a cropping intensity of 162.57 percent for the overall sample. The cropping intensity for marginal, small, semi-medium and medium size of holdings has been worked out to 185.11, 173.33, 168.78 and 164.87 respectively. This shows that marginal farmers are making more intensive use of land and this tendency is inversely related with an increase in the size of holdings. The Table 5.12 indicates the total owned area, area sown more than once, net sown area, gross cropped area and cropping intensity after agricultural diversification. In the mid-hill zone, the net sown area on an average has been worked out 1.79 hectares among all size of holdings together. The category wise break up shows an increasing trend with an increase in the size of holdings. The net sown area has been worked out 0.47, 1.05, 1.89 and 3.53 hectares on the marginal, small, semi-medium and medium size of holdings respectively. The area sown more than once has been worked out 0.42, 0.81, 1.36 and 2.38 hectares on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all holdings together, the area sown more than once come out 1.17 hectares. The cropping intensity has been worked out 189.36, 177.14, 171.96 and 167.42 percent on the marginal, small, semi-medium and medium
size of holdings respectively, whereas among all size of holdings, this percentage come out 165.36 percent. This analysis indicates that there is a positive relationship between area sown more than once as well as the net sown area with an increase in the size of holdings. The cropping intensity has shown a decreasing tendency with an increase in the size of holdings. This implies that smaller farmers have made more intensive use of the available land. Table 5.13 clearly indicates that due to diversification from subsistence crops towards vegetables, horticultural and floricultural crops, an increase in gross cropped area and cropping intensity has been recorded among all the categories of the farmers. But no change has been observed in net sown area by different size of farmers. An increase in area sown more than once has been worked out 0.02, 0.04, 0.06 and 0.09 hectares on the marginal, small, semi-medium and medium size of holdings respectively. This increase has been worked 0.05 hectares among all the size of holdings together. This table further reveals that increase in gross cropped area has been worked out 0.02, 0.04, 0.06 and 0.09 hectares on the marginal, small, semi-medium and medium size of holdings respectively. This table clearly shows an increase in the cropping intensity by 4.25, 3.81, 3.18 and 2.55 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage has been worked out 2.79 on all size of holdings together. The percentage of cropping intensity has been worked out more among marginal and small farmers as compared to semi-medium and medium farmers. It clearly implies that the smaller farmers have made more intensive use of the available land after agricultural diversification.

The cropping pattern enables us to know as to how the available land is used for cultivation of field crops, commercial crops and vegetables. Generally the farmers allocate the available land with them among different crops in accordance with the climatic conditions, type of soil, resources and technical knowhow available in the study area. The percentage share of important crops in the total cropped area before diversification in the study area has been shown in Table 6.1. This table reveals that the percentage area covered under
foodgrain crops was more among all sample households in comparison to non-
food grain crops before diversification. The percentage area covered by
foodgrain crops showed a decreasing tendency with an increase in the size of
holdings. The percentage of foodgrain crops area has been worked out 88.51,
82.97, 78.68 and 77.49 percent on the marginal, small, semi- medium and
medium size of holdings respectively, whereas this percentage on all holdings
together, come out 82.13 percent. On the other hand, the percentage area
covered by non- food grain crops i.e. vegetables showed an increasing
tendency with an increase in the size of holdings. The percentage of non- food
grain crops has been worked out 11.38, 17.03, 21.32 and 22.51 on the marginal,
small, semi- medium and medium size of holdings respectively, whereas this
percentage for all holdings together, come out 17.87 percent. A major change
has been noticed in the cropping pattern after agricultural diversification among
the sample households. All the categories of holding groups have shifted the
major area from food grain crops to more remunerative vegetables,
horticultural and floricultural crops. Table 6.2 clearly shows that the area
covered under foodgrain crops has been worked out 29.21 percent to the total
cropped area on all size of holdings together, whereas the marginal, small,
semi- medium and medium size of holdings have allocated 40.23, 32.42, 23.51
and 20.45 percent of total cropped area for the cultivation of foodgrain crops
respectively. This table shows that after agricultural diversification farmers
have reduced the area under traditional foodgrain crops as compared to the area
allocated prior to agricultural diversification. On the other hand there has been
an increase in the area cultivated for non- food grain crops, horticultural and
floricultural crops. The percentage for non- food grain crops i.e. vegetables has
been worked out 50.57, 57.14, 61.76 and 64.60 percent on the marginal, small,
semi- medium and medium size of holdings respectively, whereas for all
holdings together, this percentage come out 58.76 percent. Taking horticultural
crops, the percentage of cultivated area has been worked out 5.75, 6.59, 10.03
and 10.14 on the marginal, small, semi- medium and medium size of holdings
respectively, whereas this percentage come out 7.90 percent on all size of
holdings together. In floricultural crops, the percentage of cultivated area has been worked out 3.45, 3.85, 4.70 and 4.81 on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage on all holdings together, come out 4.12 percent. Thus this table clearly shows that now farmers has shifted from traditional foodgrain crops to high yielding crops i.e. vegetables, horticultural and floricultural crops after agricultural diversification.

The impact of agricultural diversification on the cropping pattern has been presented in Table 6.3. This table clearly shows that due to agricultural diversification the marginal, small, semi-medium and medium size of holdings had reduced the area under foodgrain crops which has been worked out 48.27, 50.55, 55.17 and 57.04 percent respectively, whereas this percentage for all size of holdings together, come out 52.91 percent. These figures clearly show that the extent of diversification is increasing with an increase in the size of holdings. The semi-medium and medium farmers have diversified from foodgrain crops to non-food grain, horticultural and floricultural crops more as compared to marginal and small farmers. The percentage increase in non-food grain crops i.e. vegetables area has been worked out 39.08, 39.56, 40.43 and 41.92 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage increase in area for non-food grain crops i.e. vegetables for all size of holdings together, come out 40.88 percent. The increase in cultivated area for horticultural crops due to higher returns has been worked out 5.75, 6.59, 10.03 and 10.14 percent on the marginal, small, semi-medium and medium respectively, whereas this percentage for all size of holdings together come out 40.88 percent. These percentages also clearly reveal that the extent of diversification has increased with an increase in the size of holdings. The semi-medium and medium farmers has diversified towards horticultural crops more than marginal and small farmers due to their larger size of holdings. In case of floricultural crops, the percentage increase in area has been worked out 3.45, 3.85, 4.70 and 4.81 percent on the marginal, small, semi-medium and medium size of holdings.
respectively, whereas this percentage increase for all size of holdings together, come out 4.12 percent. This table further reveals that almost all the size of holdings have diversified towards high income yielding non-food grain crops i.e. vegetables, horticultural and floricultural crops.

The crop-wise cropping pattern reveals the percentage area cultivated for wheat, maize, rice, pulses, peas, tomato, cabbage, cauliflower, capsicum, fruits and flowers before agricultural diversification. In Table 6.4 foodgrain crops include wheat, maize, rice and pulses, non-food grain crops include vegetables such as peas, tomato, cabbage, cauliflower and capsicum, horticultural crops include fruits while floricultural crops include the production of flowers. This table shows that the percentage area cropped for wheat has been worked out 28.86 percent for all size of holdings together, whereas this percentage has been worked out 35.63, 31.87, 25.70 and 23.19 percent on the marginal, small, semi-medium and medium size of holdings respectively. The percentage area cropped for maize has been worked out 41.38, 38.46, 34.48 and 30.76 percent on marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 34.02 percent. The trend in the percentage cropped area of both food and non-food grain crops shows that the percentage cropped area has been decreased with an increase in the size of holdings i.e. semi-medium and medium farmers have cultivated less percentage area in wheat and maize than marginal and small farmers. Before agricultural diversification maize was the main food of the people of the State because, the yield performance of maize is better than other crops. On the other hand, rice and pulses being costly, the percentage cropped area for both rice and pulses has shown increasing tendency with an increase in the size of holdings. The area under rice accounted for 4.60, 4.94, 8.46 and 10.82 percent of the total cropped area on the marginal, small, semi-medium and medium size of holdings respectively. Taking all holdings together, about 8.59 percent of total cropped area was put under rice crop. Due to high altitude of mid-hill zone, the climatic conditions have not much suitable for the cultivation of
paddy. The percentage cropped area for pulses has been worked out 6.80, 7.69, 10.03 and 12.71 percent on the marginal, small semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, come out 10.65 percent.

Before diversification, among vegetable crops peas accounted for about 3.45, 7.14, 9.09 and 9.11 percent of the total cropped area on the marginal, small, semi-medium and medium size of holdings respectively, whereas taking all size of holdings together, 7.21 percent of the total cropped area was put under peas. The cultivation of peas is the most dominant crop in the mid-hill zone of the State due to suitable climatic and topographical conditions for its cultivation. The percentage share of tomato in the total cropped area has been worked out 1.49, 1.65, 1.88 and 1.90 percent on the marginal, small, semi-medium and medium size of holding respectively, whereas this percentage for all size of holdings together, has been calculated 1.60 percent. Taking cabbage, its percentage share in the total cropped area has been worked out 2.30, 2.75, 3.76 and 3.95 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage come out 3.44 percent for all size of holdings together. Cauliflower has been the second important cultivated vegetable after peas, the percentage share of cauliflower in the total cropped area has been worked out 2.99, 3.30, 4.07 and 4.98 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage has been calculated 4.12 percent for all size of holdings together. In case of capsicum, the percentage share in the total cropped area has been calculated 1.15, 2.19, 2.51 and 2.58 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings come out 2.06 percent. This table clearly indicates that percentage share of area under maize and wheat has shown decreasing tendency with an increase in the size of holdings. Whereas contrary to it, the percentage share of area under vegetables has shown an increasing tendency with an increase in the size of holding due to their high remunerative nature. The value of diversification index for marginal, small, semi-medium and
medium size of holdings has been calculated 0.30, 0.25, 0.21 and 0.19 respectively, whereas for all size of holdings together, this value has been worked out 0.22. The value of diversification index clearly indicates that the extent of diversification increases with an increase in the size of holdings.

After agricultural diversification a major change has been noticed in the crop-wise cropping pattern among the sample households. All the categories of holdings have shifted their major land area from foodgrain crops to more remunerative vegetables, horticultural and floricultural crops. Table 6.5 shows that the area covered under wheat crop has been worked out 11.68 percent to the total cropped area on all holdings together, whereas the marginal, small, semi- medium and medium size of holdings have allocated 16.09, 13.74, 8.15 and 7.90 percent area respectively. The area under maize allocated by the marginal, small, semi- medium and medium size of holdings has been worked out 19.54, 18.68, 14.42 and 11.85 respectively, whereas taking all size of holdings together, this percentage has been worked out 16.15 percent. This table further shows that after diversification farmers have reduced the area under traditional crops as compared to the area allocated prior to agricultural diversification. In case of rice crop marginal, small, semi- medium and medium farmers have allocated 2.30, 0.55, 0.54 and 0.46 percent of the total cropped area respectively, whereas this percentage for all size of holdings together, has been worked out 0.75 percent. Taking pulses, the area cropped has been worked out 2.30, 0.44, 0.38 and 0.31 percent respectively, whereas this percentage has been worked out 0.65 percent for all size of holdings together. The vegetables has been grown on the maximum land area. Taking peas, the marginal, small, semi- medium and medium farmers have allocated 25.29, 26.92, 27.27 and 27.32 percent of the total cropped area respectively, whereas this percentage for all size of holdings together has been worked out 26.80 percent. The area allocated for tomato crop has been worked out 10.34, 13.19, 14.10 and 14.94 on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all farmers together, has been worked out 13.40 percent. In case of cabbage, the area allocated for this
crop has been worked out 3.45, 4.39, 5.64 and 6.01 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 4.81 percent of the total cropped area. Cauliflower has been allocated 9.19, 9.34, 10.34 and 11.51 percent of the total cropped area on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 10.31 percent. The area covered under capsicum has been worked out 2.29, 3.30, 4.39 and 4.81 percent on marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 3.44 percent. The horticultural and floricultural crops being more profitable crops after agricultural diversification, the area allocated for horticultural crops has been worked out 5.75, 6.59, 10.03 and 10.14 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 7.90 percent. For floricultural crops, the area allocated has been worked out 3.45, 3.85, 4.70 and 4.81 on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 4.12 percent. The value of diversification index has been worked out 0.17, 0.15, 0.14 and 0.13 on the marginal, small, semi-medium and medium size of holdings respectively, which shows that the extent of diversification has increased with an increase in the size of holdings.

The impact of agricultural diversification on the crop-wise cropping pattern has been presented in Table 6.6. This table clearly shows that due to agricultural diversification the marginal, small, semi-medium and medium size of holdings have reduced the area under foodgrains crops. However, the percentage reduction in the area cropped under wheat and maize crops shows less decrease with an increase in the size of holdings because semi-medium and medium size of holdings are still cultivating wheat and maize crops on large area due to their larger size of holdings than marginal and small holdings. The percentage reduction in the cropped area for wheat has been worked out
19.54, 18.13, 17.55 and 15.29 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 17.18 percent. In case of maize, the percentage reduction in the cropped area has been worked out 21.84, 20.88, 20.06 and 19.80 percent to the total cropped area on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 17.87 percent. On the other hand, the percentage reduction in the area cultivated under rice and pulses increases with an increase in the size of holdings, this percentage reduction in the area cultivated under rice has been worked out 2.30, 4.39, 7.83 and 10.31 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 7.90 percent. In case of pulses, the percentage reduction in the area cultivated has been worked out 4.59, 7.14, 9.72 and 12.37 percent respectively, whereas for all farmers together, this percentage has been worked out 9.96 percent.

After agricultural diversification, a major increase has been noticed in the area cultivated under vegetables. Peas has recorded the highest increase in the total cropped area due to suitable climatic conditions for its cultivation in the study area. The percentage increase in the area cropped under peas has been worked out 21.84, 19.78, 18.18 and 18.04 on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all holdings together, has been worked out 19.59 percent. Tomato being the second largest crop after peas, has accounted for 9.19, 11.54, 12.22 and 13.06 percent increase on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage increase has been worked out 12.37 percent. For cabbage, the percentage area cultivated has been increased by 1.15, 1.65, 1.88 and 2.06 percent on the marginal, small, semi-medium and medium size of holdings respectively. For all size of holdings together, this percentage has been worked out 1.37 percent. Cauliflower has been another important vegetable crop after agricultural
diversification, the percentage increase in the area cropped under this crop has been worked out 5.75, 6.04, 6.26 and 6.53 percent on the marginal, small, semi- medium and medium farmers respectively, whereas this percentage has been worked out 6.18 for all size of holdings together. The increase in the area cropped under capsicum has been calculated 1.15, 1.26, 1.88 and 2.23 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage increase for all size of holdings together, has been worked out 1.37 percent. Now, horticultural and floricultural crops have become more profitable like vegetables due to the increase in their demand. The semi- medium and medium farmers due to their larger size of holdings have allocated more land for the cultivation of horticultural and floricultural crops as compared to marginal and small farmers. This increase for area cultivated under horticultural crops has been recorded 5.75, 6.59, 10.03 and 10.14 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 7.90 percent. In case of floricultural crops, 3.45, 3.85, 4.70 and 4.81 percent increase has been recorded on the marginal, small, semi- medium and medium size of holdings respectively. For all size of holdings together, this percentage has been recorded 4.12 percent.

The value of Herfindahl Index of diversification before agricultural diversification has been presented in Table 6.7. These values on the marginal, small, semi- medium and medium size of holdings has been worked out 0.30, 0.25, 0.21 and 0.19 respectively, whereas this value for all size of holdings together, come out 0.22 according to Herfindahl Index. There exists an inverse relationship between the value of Herfindahl Index and the extent of crop diversification i.e. with an increase in the index value, the diversification of crops decreases and with the decrease in the index value, crop diversification increases. Table 6.8 reveals the value of Herfindahl Index after agricultural diversification. The values of index on the marginal, small, semi- medium and medium size of holdings has been calculated 0.17, 0.15, 0.14 and 0.13 respectively. These values also indicate the inverse relationship with the size of
holdings. Further, Table 6.8 depicts that the value of Herfindahl index after diversification come out lower as compared to the value of this index before agricultural diversification. This denotes that the diversification has increased among all the size of holdings after shifting the cultivable area from traditional foodgrain crops to the more remunerative vegetables, horticultural and floricultural crops.

In Himachal Pradesh, farm crops, vegetables, horticulture and floriculture are the major sources of income. The pattern of household per month agricultural income before agricultural diversification has been presented in Table 6.9 for the sample households. This table clearly shows that farm income from foodgrain crops accounted for 43.18, 44.57, 48.68 and 50.73 percent on the marginal, small, semi- medium and medium farmers respectively, whereas this percentage for all holdings together, has been calculated 46.92 percent. The share of vegetables has been less before diversification among all the size of holdings, which has been worked out 7.21, 9.91, 15.47 and 20.04 percent on the marginal, small, semi- medium and medium size of holdings respectively. This percentage for all size of holdings together, has been worked out 13.24 percent. The livestock has been another important activity before diversification and its share in the total income has been worked out 46.33, 42.68, 32.73 and 25.94 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage has been worked out 36.98 percent for all size of holdings together. The other agricultural activities has accounted 2.68, 2.84, 3.12 and 3.28 percent of the total income among the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 2.86 percent. This table further reveals that income from food grain crops, vegetables and other agricultural activities showed an increasing tendency with an increase in the size of holdings, whereas with the increase in the size of holdings, the percentage income from livestock has shown a decreasing tendency. It happened mainly due to the reason that marginal and small farmers supplement their meagre household
income by selling livestock products. After agricultural diversification the source-wise per month pattern of per household income has changed. Table 6.10 clearly depicts that after agricultural diversification, income from foodgrain crops has been reduced steeply and contrary to it, the income from vegetables, horticulture and floriculture has shown an increasing tendency with an increase in the size of holdings. This table reveals that income from foodgrain crops accounted for 18.46, 18.33, 11.22 and 7.22 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all holdings together, this percentage has been worked out 13.89 percent. The percentage of income from vegetables shows an increasing tendency with an increase in the size of holdings. It means that the maximum sample households have shifted their foodgrain crops growing land area for the production of vegetables, horticultural and floricultural crops, which are more remunerative in nature. The reverse trend has been observed in case of livestock activities i.e. with an increase in the size of holdings the income from livestock shows a decreasing tendency. This happened mainly due to the reason that semi-medium and medium farmers mostly use the livestock products for domestic use, whereas the households falling on the marginal and small size of holding groups sell the livestock products in the market in order to supplement their meagre household income. The percentage share of income from vegetables has accounted for 32.46, 36.51, 48.18 and 51.22 on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage has been worked out 42.41 percent for all size of holdings together.

Livestock activities have been most important among the marginal and small farmers which accounted for 36.64 and 31.89 percent of the total monthly income respectively. Among the semi-medium and medium size of holdings, this percentage has been worked out 23.72 and 18.32 percent on the total income respectively, whereas this percentage share for all size of holdings has been recorded 27.49 percent. Taking horticultural crops, the percentage share in the total income of the marginal and small farmers has been worked out less due to their small size of holdings comparatively to semi-medium and medium
size of holdings. The horticultural crops accounted for 6.26, 6.90, 10.11 and 15.61 percent of the total monthly income of the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all holdings together, has been worked out 9.84 percent. The percentage share of floricultural crops in the total monthly income has been recorded 3.25, 3.32, 3.37 and 3.91 percent on the marginal, small, semi-medium and medium size of holdings respectively. For all size of holdings together, this percentage has been worked out 3.43 percent. The other activities has accounted for 2.94, 3.04, 3.40 and 3.72 percent of the total monthly income on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 2.93 percent. Further, this table clearly shows that after agricultural diversification, the percentage share of income from commercial crops like vegetables, horticultural and floricultural crops has increased significantly especially of semi-medium and medium size of holding groups. The comparison of the pre-diversification and post-diversification household per month income has been presented in Table 6.11. This table clearly depicts that 16.85, 17.38, 31.30 and 39.38 percent decrease has been recorded in the income from food grain crops for the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 26.12 percent. In case of vegetable crops about 38.49, 44.25, 59.09 and 60.45 percent increase in the income has been calculated on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 50.26 percent. The income from livestock activities show 5.93, 4.63, 3.98 and 2.84 percent increase on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all size of holdings together, this increase has been recorded 4.18 percent.

The horticultural crops show more increase in income among the semi-medium and medium farmers due to their larger size of holdings as compared to marginal and small farmers. The per month percentage increase in the
income of the marginal, small, semi-medium and medium size of holdings has been recorded 8.93, 10.24, 15.64 and 24.54 percent respectively, whereas among all size of holdings together, this percentage increase in income has been worked out 14.73 percent. In case of floricultural crops, the per month percentage increase in the income of all size of holdings together, has been calculated 5.14 percent, whereas this percentage increase on the marginal, small, semi-medium and medium size of holdings has been recorded 4.63, 4.92, 5.21 and 6.14 percent respectively. The income from other activities has also shown an increasing tendency with an increase in the size of holdings. The per month percentage increase in income from other activities has been worked out 1.51, 1.67, 2.14 and 2.56 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been calculated 1.53 percent. This table clearly shows that there has been a decrease in the income from foodgrain crops after agricultural diversification but the income from vegetables, horticultural and floricultural crops has shown an significant increase, as a result of it, the overall increase in per month income of the marginal, small, semi-medium and medium size of holdings has been recorded 42.65, 48.32, 54.75 and 57.15 percent, whereas among all size of holding together, this percentage increase has been recorded 49.72 percent. The marginal and small farmers have raised their income through vegetables and livestock activities more due to their smaller size of holdings while semi-medium and medium farmers have raised their income more through vegetables and horticultural crops in due to their larger size of holdings.

The pattern of non-agricultural household income before agricultural diversification has been presented in Table 6.12 for the sample households. This table clearly shows that before agricultural diversification, services have been the major source of income than other activities. The per household per month income from services has been recorded 38.46, 44.88, 50.28 and 54.63 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been
worked out 48.99 percent. The contribution of income from business has accounted for 10.25, 12.83, 20.68 and 28.38 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 18.14 percent of the total per month household income. The income from household industries has been calculated 6.42, 4.56 and 1.92 percent for marginal, small and semi-medium size of holdings respectively, whereas this percentage has been worked out 3.55 percent among all holdings together. The medium farmers were not engaged in household industries. The percentage contribution of wage work in the household per month income has been recorded 38.79, 29.23, and 15.76 percent on the marginal, small and semimedium size of holdings respectively, whereas this percentage among all the size of holdings has been worked out 18.41 percent. The income from pension has been accounted for 2.52, 3.64, 4.57 and 6.74 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been calculated 4.47 percent. The household per month income from other activities has been recorded 3.56, 4.86, 6.79 and 10.25 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 6.44 percent. This table clearly shows that the income from services, business, pensions and other activities has shown an increasing tendency with an increase in the size of holdings while income from household industries and wage work has shown a decreasing tendency with an increase in the size of holdings. The marginal and small farmers have been engaged in wage work and household industries in more proportion due to their smaller size of holdings. The semi-medium and medium farmers has been engaged in services and business activities in more proportion due to their regular and sound sources of income as well as due to larger size of holdings. The pattern of household non-agricultural income after agricultural diversification has been worked out in Table 6.13 for the sample households. This table shows that the farmers who were earlier engaged in the
private sector jobs has now shifted to their own agricultural work due to the significant increase in their agricultural income after agricultural diversification. The income from services has also shown a decreasing tendency with an increase in the size of holdings, which means that larger size of holdings had now shifted to their own agricultural work due to the more remunerative commercial crops. The per household per month income from services has been worked out 31.49, 30.84, 30.25 and 21.37 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 28.42 percent. After agricultural diversification due to increase in the income of the households, there has been an increase in the business activities which has also shown an increasing tendency with an increase in the size of holdings. The household per month income from the business activities has accounted for 33.21, 44.79, 51.11 and 55.42 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 46.08 percent. There has been a decrease in the income from household industries and now only marginal and small farmers have been engaged in this activity. The household per month income from household industries has been worked out 5.06 and 2.87 percent on the marginal and small size of holdings respectively.

The wage work has been the second most important source of income of the marginal and small farmers before agricultural diversification which has recorded an significant reduction in its percentage share of income after agricultural diversification due to the gainful employment on their own holdings due to cultivation of commercial crops. The household per month income from wage work among the marginal and small farmers has been worked out 15.84 and 5.36 percent respectively, whereas this percentage for all holdings together, has been worked out 5.56 percent. In case of the household per month income from pension, the percentage share in the total income has been calculated 2.67, 3.64, 4.29 and 5.85 percent respectively, whereas this percentage for all size of holdings together, has been calculated 4.10 percent.
Due to agricultural diversification, there has been expansion in other activities also, as a result the household per month income from other activities has been recorded 11.72, 12.50, 14.35 and 17.35 percent among the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been recorded 13.92 percent. This table clearly shows that due to agricultural diversification almost all the holdings have now got enough work in the cultivation of their own agricultural, horticultural and floricultural crops, as a result there has been recorded a decreasing tendency in income with an increase in the size of holdings in case of services, household industries and wage work. On the other hand, due to agricultural diversification, there has been expansion in other activities such as business etc. which shows an increasing tendency in the income with an increase in the size of holdings. The impact of agricultural diversification on household per month income has been presented in the Table 6.14. This table clearly shows that there has been an increase in the overall household per month income after agricultural diversification, but in case of individual activities this increase has been recorded in business activities, pensions and other activities due to increase in the income of the households. But, in case of services, household industries and wage work, a reduction in the household per month income has been recorded due to the reason that now the farmers have got enough work in their own agricultural activities. An increasing tendency in the reduction of per household per month income in case of services and household industries with an increase in the size of holdings has been recorded due the reason that majority of the semi-medium and medium farmers has shifted to commercial agricultural crops. After agricultural diversification, there has been an overall increase in household per month total income which has resulted in the expansion of business and other activities. Due to this reason, an increasing tendency in the household income with an increase in the size of holdings has been recorded. The reduction in the household per month income in case of services has been worked out 2.13, 8.25, 12.84 and 27.00 percent on the marginal, small, semi-medium and medium size of holdings.
respectively, whereas this percentage for all size of holdings together has been worked out 13.69 percent. This reduction has been observed due the reason that the households who were engaged in the private casual jobs prior to the agricultural diversification are now earning more from their own agricultural, horticultural and floricultural crops.

The household per month income from business activities indicates an increase after agricultural diversification. This percentage increase for marginal, small, semi-medium and medium size of holdings has been recorded 28.05, 40.36, 42.59 and 43.26 percent respectively, whereas this percentage for all size of holdings together, has been worked out 39.09 percent. A reduction in the household per month income from household industries has been recorded due to the fact that these industries due to high cost of production were not useful prior to the agricultural diversification. The reduction in the household per month income from household industries has been worked out 0.58, 1.15 and 1.92 percent among the marginal, small and semi-medium size of holdings respectively. The income from wage work has been one of the important sources of household income of the marginal and small size of holdings prior to the agricultural diversification, the share of which has been reduced after agricultural diversification as these households have got enough work in their own agricultural activities. This activity accounted for 20.52, 22.86 and 15.76 percent reduction in the income of the marginal, small and semi-medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 11.50 percent. There has been slight increase in the household per month income from pensions among all size of holdings, which has been worked out 0.56, 0.68, 0.74 and 0.83 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all holdings together, has been worked out 0.62 percent. After agricultural diversification, there has been an increase in the household per month income from other activities which has been calculated 9.96, 9.99, 10.97 and 12.17 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together
has been worked out 10.85 percent. Thus, it can be concluded that after agricultural diversification a reduction in the household per month income from services, household industries, wage work etc. has been recorded due to the reason that the farmers are now getting more remunerative work in their own fields because of diversification, at the same time an increase in the household per month income has been recorded from business, pensions, other activities etc. Thus, an overall increase in the household per month income after agricultural diversification has been recorded i.e. 15.34, 18.76, 23.78 and 29.26 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 24.19 percent.

The pattern of human labour employment in foodgrain crops, vegetables, horticultural crops, floricultural crops and livestock activities before agricultural diversification during the whole agricultural year has been presented in Table 6.15 for all size of holdings. The human labour utilized for food grains crops has been calculated 130.65, 215.02, 289.49 and 372.02 standard mandays on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, these standard mandays has been worked out 222.11. In terms of percentage, 38.88, 42.56, 45.35 and 46.59 percent of the total mandays has been allocated for food grain crops on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 43.26 percent. The per year per household standard mandays allocated for non- food grain crops has been worked out 25.78, 49.76, 80.94 and 147.32 on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, 62.53 standard mandays has been allocated. In terms of percentage, 7.67, 9.85, 12.68 and 18.45 percent of the total standard mandays has been allocated on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage has been worked out 12.18 percent for all size of holdings together. Livestock activities has been another important activity before agricultural diversification,
for which the standard mandays allocated has been worked out 179.56, 240.45, 267.97 and 279.15 on the marginal, small, semi- medium and medium size of holdings respectively, whereas 228.78 standard mandays have been allotted among all size of holdings together. In terms of percentage, these standard mandays has been worked out 53.44, 47.59, 41.97 and 34.96 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 44.56 percent. This table further shows that there has been recorded an increasing tendency with an increase in the size of holdings in case of foodgrain crops and vegetables due the reason that all the holdings has been more dependent on these crops before agricultural diversification while in case of livestock activities there has been recorded a decreasing tendency with an increase in the size of holdings due to the reason that the small size of holdings have been more dependent on livestock activities due to the milch cattle.

The pattern of human labour employment in foodgrain crops, vegetables, horticultural crops, floricultural crops and livestock activities after agricultural diversification has been presented in Table 6.16 for all size of holdings per year. The labour utilized for foodgrains crops has been calculated 63.06, 110.46, 150.65 and 197.79 standard mandays on the marginal, small, semi- medium and medium size of holdings respectively, whereas for all size of holdings together, these standard mandays has been worked out 115.42. In terms of percentage, 13.56, 14.91, 15.19 and 15.21 percent of the total mandays has been allocated for foodgrain crops on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 14.77 percent. The per year household standard mandays allocated for non- food grain crops has been worked out 178.68, 303.02, 436.68 and 608.03 on the marginal, small, semi- medium and medium size of holdings respectively, whereas for all size of holdings together, 325.29 standard mandays has been allocated. In terms of percentage, 38.42, 40.90, 44.03 and 45.44 percent of the total standard mandays has been allocated on the marginal, small, semi- medium and medium.
size of holdings respectively, whereas this percentage has been worked out 41.64 percent for all size of holdings together. The livestock activities has been another important activity after agricultural diversification, in which the standard mandays allocated has been worked out 180.14, 250.69, 283.10 and 299.19 on the marginal, small, semi- medium and medium size of holdings respectively, whereas this number come out 238.97 standard mandays among the all size of holdings together. In terms of percentage, these standard mandays has been worked out 38.73, 33.83, 28.55 and 22.36 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 30.59 percent. The horticultural and floricultural crops have now become significant sources of household income after agricultural diversification among the sample households. The standard mandays utilized in the horticultural crops has been worked out 26.74, 45.34, 67.92 and 141.57 on the marginal small, semi- medium and medium size of holdings respectively, whereas on all size of holdings together, these mandays has been worked out 62.15. In terms of percentage, the standard mandays come out 5.75, 6.12, 6.85 and 10.58 on the marginal, small, semi- medium and medium size of holdings respectively, whereas for all size of holdings together, this percentage has been worked out 7.95 percent. The floricultural crops has been another important source of income after agricultural diversification in which 16.46, 31.41, 53.36 and 91.53 standard mandays has been recorded on the marginal, small, semi-medium and medium size of holdings respectively, whereas for all size of holdings together, 39.38 standard mandays has been allocated. These figures in terms of percentage come out 3.54, 4.24, 5.38 and 6.84 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 5.04 percent. Thus this table shows an increasing tendency in the percentage of standard mandays utilization with an increase in the size of holdings in case of foodgrain crops, vegetables, horticultural and floricultural crops due the reason that all the holdings groups have increased in their income from these crops.
after agricultural diversification whereas contrary to it, in livestock activities there has been a decreasing tendency with an increase in the size of holdings due to the reason that the small size of holdings has been more dependent on livestock activities for supplementing their meager household income as the milch cattle have been given to the marginal and small farmers under Government ant-poverty programme on subsidized basis. These households sell the milk and milk products in the market inorder to increase their income.

The pre and post agricultural diversification situation has been presented in Table 6.17 which clearly reveals that due to the shift from the foodgrain crops to vegetables, horticultural and floricultural crops, the percentage of mandays utilized in foodgrain crops has decreased by 20.12, 20.69, 21.75 and 21.82 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this decrease come out 20.78 percent on all holdings together. It has been noticed that due to diversification, there has been a decreasing tendency in the household labour utilization for foodgrain crops with an increase in the size of holdings because of the fact that larger holdings has been utilizing more household labour now for the production of cash crops such as vegetables, horticultural and floricultural crops. The labour utilized for the production of vegetables has been recorded the highest percentage increase as compared to other crops among all the size of holdings. The percentage increase in labour utilization for the production of vegetables has been worked out 45.51, 50.13, 55.73 and 57.70 percent on the marginal, small, semi-medium and medium respectively, whereas this percentage increase for all size of holdings together, has been worked out 51.18 percent. In case of livestock activities, there has been an increasing tendency in the mandays utilization among all the holding groups due the reason that now the larger size of holdings have also engaged in this activity because of the increase in their livestock income after agricultural diversification. The percentage increase in the mandays utilized for livestock activities has been worked out 0.17, 2.03, 2.38 and 2.51 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas the percentage increase for all size of
holdings together, has been worked out 1.98 percent. This table further shows that horticultural and floricultural crops have now become significant source of increase in income of the sample households, particularly of the semi-medium and medium farmers due to their larger size of holdings. The percentage increase in the mandays utilized for the production of horticultural crops has been calculated 7.96, 8.97, 10.64 and 17.73 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage increase for all size of holdings together, has been worked out 12.10 percent. Taking floricultural crops, the percentage increase in the mandays utilized for these crops has been worked out 4.90, 6.22, 8.36 and 11.46 percent among the marginal, small, semi-medium and medium size of holdings respectively, whereas for all holdings together, this percentage increase in mandays has been worked out 7.67 percent. This table clearly reveals that there has been an increase in the overall mandays utilized after agricultural diversification due the fact that there has been significant increase in the income of all the holdings. The percentage increase in the overall mandays utilized has been worked out 38.42, 46.65, 55.36 and 67.58 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage increase for all size of holdings together, has been worked 52.16 percent. This table clearly shows that there has been a significant change in the employment after agricultural diversification i.e. now all the sample households have got enough gainful employment on their own holdings due to the increased agricultural, horticultural, floricultural and livestock activities.

The standard of living of the people mainly depends on assets possessed by the individual household. Therefore, simple to adjudge the standard of living is the distribution pattern of household assets. So the value of household assets before and after agricultural diversification has been taken into consideration in the present study. All these assets add to the income of the households and provide gainful employment to the family workforce. The distribution pattern of household assets before agricultural diversification has
been presented in Table 6.18. It is evident from the table that land occupied a lion’s share to the total value of household assets followed by buildings, livestock, household durables, agricultural implements and machinery. The percentage value of land to the total value of household assets has been worked out 58.98, 59.30, 59.80 and 60.20 percent in respect of marginal, small, semi-medium and medium size of holding group respectively. Among all holdings together land accounted for 59.61 percent to the total value of household assets as it is the main productive asset, which provides direct employment to the family labour force. The percentage value of land shows an increasing tendency with an increase in the size of holdings. The percentage value of livestock to the total value of household assets has been worked out 13.00, 13.20, 13.40 and 13.60 on the marginal, small, semi-medium and medium size of holdings respectively, whereas among all the size of holdings together, the value of livestock has been worked out 13.60 percent. The percentage value of livestock increases with an increase in the size of holdings. It is important to mention here that smaller holdings groups have been supplied with milch cattle on subsidized rates by the Government under the anti-poverty programmes. Almost all the marginal and small farmers own milch cattle to supplement their meager household income. Although the large farmers have the capacity to purchase these income generating milch cattle out of their own savings due to their sound financial position, yet they are not much inclined to sell livestock products in the market in order to augment their income but generally meet out their own domestic requirements. The percentage value of agricultural implements to the total value of household assets increases with an increase in the size of holdings due to the reason that farmers falling on the semi-medium and medium size of holdings are considered to be economically better off and have a capacity to spare large amount of income to buy better and improved agricultural implements and machinery. Agricultural implements constituted 1.80, 1.82, 1.90 and 1.95 percent of total assets on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 1.85 percent. The percentage
share of the machinery has been calculated 1.30, 1.40, 1.50 and 1.60 on the marginal, small, semi- medium and medium size of holdings respectively. This percentage among all size of holdings together has been worked out 1.40 percent. It also shows an increasing tendency with an increase in the size of holdings due to the reason that large farmers have more capacity to buy machinery because of their higher income.

The value of buildings has been worked out the second highest in the total household assets after land before agricultural diversification. It also shows an increasing tendency with an increase in the size of holdings due the reason that semi- medium and medium size of holdings have higher income and they can spend more on the construction of buildings than marginal and small farmers. The percentage value of buildings to the total value of assets has been worked out 21.20, 21.60, 21.90 and 22.10 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage value has been worked out 21.63 percent for all size of holdings together. The percentage value of household durables also shows an increasing tendency with an increase in the size of holdings due to the reason that semi- medium and medium size of holdings have more purchasing capacity than marginal and small farmers. The percentage value of household durables in the total household assets has been calculated 2.10, 2.25, 2.60 and 3.05 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all holding together has been worked out 2.45 percent.

The distribution patterns of household assets after agricultural diversification have been presented in Table 6.19. It is evident from the table that after agricultural diversification the percentage value of land to the total value of household assets has been worked out 60.65, 61.70, 62.03 and 62.20 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage value for all size of holdings together has been worked out 61.60 percent. Land being the major productive assets in the
rural areas shows an increasing tendency with an increase in the size of holdings. The percentage value of livestock to the total value of assets has been worked out 11.02, 9.16, 8.55 and 7.20 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 8.25 percent. This shows a decreasing tendency with an increase in the size of holdings due to the reason that after agricultural diversification marginal and small farmers were more dependent on milk cattle for their meager household income while semi-medium and medium farmers were not selling livestock products because they are earning sufficient from agricultural, horticultural and floricultural crops due to their larger size of holdings. The percentage value of agricultural implements shows an increasing tendency with an increase in the size of holdings because larger farmers now require more agricultural implements for cultivation of these crops due to diversification. The percentage value of the agricultural implements to the value of total household assets has been worked out 2.39, 2.80, 3.09 and 3.35 percent on the marginal, small, semi-medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 2.78 percent. This table further shows that after agricultural diversification the percentage value of machinery to the total value of household assets also shows an increasing tendency with an increase in the size of holdings and this percentage has been worked out 1.48, 1.60, 1.68 and 2.00 percent as the marginal, small, semi-medium and medium size of holdings respectively. The percentage value of machinery to the total household assets has been worked out 1.65 percent on all size of holdings together. The percentage value of building remained the second highest in the total household assets due to the reason that now due to better economic position all the households have been improved their standard of living and it also shows an increasing tendency with an increase in the size of holdings. Taking household durables, the percentage value of these assets to the total household assets has been worked out 3.20, 3.30, 3.50 and 3.58 percent on the marginal, small, semi-medium and medium size of holdings respectively.
whereas this percentage value for all size of holdings together has been worked out 3.40 percent.

The comparison of the value of household assets during the pre and post agricultural diversification has been presented in Table 6.20. This table clearly depicts that the value of land has increased by 40.12, 40.30, 40.42 and 44.02 percent in respect of marginal, small, semi- medium and medium size of holdings respectively. Among all the holdings together, this percentage increase come out 41.12 percent. This table clearly indicates that there has been a significant increase in the value of land after agricultural diversification due to the reason that now land has become the most important source of income among all the size of holdings. It also shows an increasing tendency with an increase in the size of holdings. The livestock activities being more important among the marginal farmers for supplementing their meager household income has shown a decreasing tendency with an increase in the size of holdings. Thus, the percentage increase in the value of livestock in the total household assets has been worked out 5.02, 1.60, 0.41 and 0.24 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage increase for all size of holdings together, has been worked out 1.39 percent. The percentage increase in the value of agricultural implements has been worked out higher among the larger size of holdings because they required large number of agricultural implements after agricultural diversification due to their large size holdings. The percentage increase in the value of agricultural implements among the total household assets has been worked out 1.31, 1.70, 1.78 and 1.92 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage increase for all holdings together has been worked out 1.76 percent. The percentage value of agricultural implements has also shown an increasing tendency with an increase in the size of holdings due to the reason that larger holdings have higher buying capacity than small holdings. The percentage increase in the value of machinery to the total household assets has shown an increasing tendency with an increase in the size of holdings due the reason that
the larger size of holdings use the machinery for the cultivation of crops which reduces the cost of production. The percentage increase in the value of machinery among the total household assets has been worked out 1.12, 1.18, 1.22 and 1.75 percent on the marginal, small, semi- medium and medium size of holdings respectively. This percentage for all size of holdings together has been worked 1.30 percent to the total household assets.

After agricultural diversification, there has been a significant increase in the income of all the farmers which led to an increase in their standard of living. The households have spent more on the construction of buildings and the percentage increase in the value of building among the total value of assets has been worked out 13.87, 14.22, 15.14 and 16.70 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together has been worked out 15.65 percent. The change in the value of household durables has also been recorded after agricultural diversification. Now, all the households have been able to buy more household durables due to an increase in their household income. The percentage increase in the value of household durables has been worked out 2.13, 2.53, 2.60 and 2.92 percent on the marginal, small, semi- medium and medium size of holdings respectively, whereas this percentage for all size of holdings together, has been worked out 2.45 percent. This table further depicts that after agricultural diversification, there has been a significant change in the value of household assets due to an increase in the income of the households.

The study of returns to scale assumes importance in agricultural sector, since it shows the prospects for the long term growth in the farm sector. The returns to scale imply the behavior of the change of total returns (total output in physical terms) when all inputs are changed simultaneously in the same proportion. The sum of regression co- efficient has been tested for its difference from unity. The returns to scale are increasing, constant or decreasing accordingly as the sum of regression co- efficient is greater than, equal to or less than unity respectively. The returns to scale have been taken to
be constant only if the calculated value did not differ significantly from unity. It is clear from the Table 7.11 that the sum of regression co-efficients for foodgrain crops is less than one in case of marginal, small, semi-medium and medium size of holdings and is statistically different from unity which indicates decreasing returns to scale in view of the fact that the foodgrain crops are less remunerative and have low per hectare productivity. It has also been seen that now all the farmers are producing foodgrain crops for their own consumption. The results of the returns to scale in case of vegetable production have been presented in Table 7.12. All categories of holdings have been operating at increasing return to scale. It happened mainly due to the climatic conditions of the study area which is more suitable for vegetable production and thereby these crops have high per hectare productivity in comparison to the foodgrain crops. The results clearly indicate that if all the factors included in the production function are simultaneously increased in equal proportion, the vegetables output increases at increasing rate. Increasing returns to scale have also been come out for all holding groups together. The returns to scale in the production of horticultural crops have been presented in Table 7.13. In case of marginal holdings, the constant returns to scale have been worked out because the sum of regression co-efficient does not differ significantly from unity. All the other sizes of holding groups i.e. marginal, small, semi-medium and medium size of holdings are operating at increasing returns to scale due to the reason that the climatic conditions are suitable for the production of horticultural crops in the study area. On the other hand, these crops are also more remunerative and have high per hectare productivity. The study area has been found most suitable for the production of floricultural crops due to the suitable climatic and soil conditions. It has also been proved empirically that the farmers are shifting to the cultivation of commercial crops due to high per hectare productivity as well as more income generating capacity of these crops. The returns to scale in case of floricultural crops have been presented in Table 7.14. This table clearly reveals that all the size of holding groups are operating at increasing returns to scale in the production of floricultural crops.
Thus from the above empirical results, it can be concluded that due to the suitable topography, climate and soil, the increased cultivation of commercial crops i.e. vegetables, horticultural and floricultural crops possess immense scope for the agricultural diversification in the mid- hill zone of the State of Himachal Pradesh. If the minimum required infrastructural and marketing facilities will be provided to the farmers and improved technology, hybrids seeds, fertilizers, irrigation facilities, insecticides and pesticides will be made available to them on subsidized basis well in time, the agricultural diversification in the above direction will provide increased gainful employment and income generating opportunities which finally will improve the levels of living of the people.