

# CROP DIVERSIFICATION IN HIMACHAL PRADESH WITH SPECIAL REFERENCE TO DISTRICT UNA

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*Diversification is an integral part of structural transformation of an economy. In view of the importance of agriculture in the context of state economy and that large number of changes brought about in agricultural set up, it is necessary to study the growth and trends in area, production and productivity under food grains in Himachal Pradesh in general and district Una in particular in the light of economic development in the state. The increasing emphasis on production of per unit of cultivation and per unit of time has compelled the farmers to gradually mechanize their farm to be able to complete farm operation with thoroughly and in time. The statistical results show that there exists complete diversification of agriculture in Himachal Pradesh as well as in Una district. The value of the Herfindhal diversification index remains equal to zero. This shows that the economy of Himachal Pradesh and district Una are diversified gradually day by day. Moreover, the study suggests that there is need of more detailed analysis and an attempt should be made at least to analysed the additional factors and intensify such factors affecting the land use, cropping pattern, changes in production and productivity in the agricultural sector of Himachal Pradesh as well in Una district.*

## INTRODUCTION

Diversification becomes necessary since growing of basic problems such as cereal can't alone support economic development notwithstanding the need to ensure food security to the people. In the context of state agriculture diversification has occurred across and within crop, horticulture and vegetable production. In Himachal there are four major objectives of agricultural diversification. First to increase the income of the small households, second to attain the fuller employment in the farm household, third to stabilize the farm income over the seasons, and fourth conservation and enhancement of natural resources. Diversification is an integral part of structural transformation of an economy. The agriculture diversification is not possible without appropriate infrastructural and institutional reforms. Agricultural diversification needs appropriate credit facilities for purchasing of inputs, high yielding varieties of seeds and chemicals, insecticides etc. the irrigated and un-irrigated land also affects it. Agricultural diversification requires high investment of capital and labour inputs. There is need for development of not only appropriate farm production technology, but also processing and marketing technology. It also depends on availability of infrastructural facilities, which would link the local farmers with national and global markets. In view of the importance of agriculture in the context of state economy and that large number of changes brought about in agricultural set up, it is necessary to study the growth and trends in area, production and productivity under food grains in Himachal Pradesh in general and Una district in particular in the light of economic development in the state.

The study aims :

- To study the crop diversification with respect to Area, production and productivity under different crops (i.e. food and non food grains crops).

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- To identify the factors which are responsible for crop diversification?
- and to explore the possibilities of agricultural diversification in the study area.

## DATA AND METHODOLOGY

The present study is basically a review study and relies entirely upon the secondary sources. The study is carried out through scanning of already existing literature on the concerned subject. Being a secondary study, the data pertaining to the present study have been collected from district statistical office Una, Economic and Statistics department Shimla, Directorate of land records Shimla and Agro-economic research centre Himachal Pradesh University, Shimla. The secondary information's have also been collected from various published and unpublished documents such as books, journals, articles, research reports, Economic survey of State and various publications of different departments of government. The study period covers from 1997-98 to 2007-08 i.e. only one decade. On the basis of secondary data Herfindhal index is used to know the nature and extent of agricultural diversification in the study area.

The index has been computed by using the following method:

$$\text{Herfindhal Index} = \sum_{i=1}^n P_i^2 \quad \text{Where } P_i = \frac{A_i}{\sum_{i=1}^n A_i}$$

Where  $P_i$  is the proportion of area under  $i$ th crop and  $A_i$  is the actual area under  $i$ th crop. The index is defined as sum of the squares of all 'n' proportions and is a measure of concentration. For increasing diversification, H is decreasing and vice-versa. It is bounded by '0' (complete diversification) and 1 (complete specialization). For the time series data compound growth rate have also been calculated by using the following method:

Compound Growth Rate

$$Y = abt$$

$$\log Y = \log a + t \log b$$

$Y$  = a parameter whose CGR is calculated  
 $a$  = constant term  
 $t$  = time variable  
 $b$  = regression coefficient of time  
 where  $b = \text{antilog}(\log b)$   
 $\text{CGR} (\%) = (b-1) \times 100$

## LITERATURE REVIEW

The review of literature is of great importance in carrying out any further research work. It becomes imperative and prime task to review the research studies related to the present investigation in order to draw insights for selecting appropriate methodology. Moreover, the researcher is benefits as he become well convergent with the subject matter of the problem under consideration and can incorporate modifications over these studies and avoid duplication of the research work already accomplished. Kalia (1983) examined the diversification of agriculture in Himachal Pradesh. There exists wide divergence in the system of cultivation, cropping pattern and cropping season. The land is mainly utilized for agriculture, horticulture, forestry as also raising of livestock wheat is the

most important crop accounting for about 35 per cent of gross cropped area most of the cultivated area in Himachal Pradesh is rain fed. Singh et al. (1985) studied the impact of diversification in agriculture on level of income and employment of rural poor in district Kanpur (Uttar Pradesh). The study revealed that consumption expenditure exceeded the income in both the diversified and non diversified categories of families which resulted into dissavings on an average. Thakur et al. (1985) conducted the study in the Sproun valley of district Solan in Himachal Pradesh which is famous for its quality vegetables and vegetable seeds production throughout the country. The study emphasis that diversification towards intensive vegetables cultivation can enable farmers to get yields which are ten times higher than cereals crop per unit of land. As the price of vegetables also remains higher than that of cereals, diversification of farming with vegetables production helps even the small farmers to earn sufficient income to make their livelihood. Sethi and Kanwar (1986) studied the diversification of factors affecting sugarcane and sugar production in India. The findings of the study revealed that sugarcane production is higher in the sub tropical than tropical region. Bhatia and Tiwari (1990) examined the pattern of diversification in the economy of Uttar Pradesh, particularly over a period of 14 years from 1970-71 to 1983-84. The Herfindhal and Entropy index is used to measure the diversification. The study suggests that growth in real income of the state as well as growth in real income contributed by primary, secondary and tertiary sector was statistically insignificant during the 14 years period. It can be inferred that Uttar Pradesh economy is undergoing gradual diversification in favour of secondary and tertiary sectors which is a healthy sign of economic development. Pandey and Sharma (1996) evaluated the performance and prospects of growth in food grains crops as against the performance and possibilities of crop diversification in country. The study divided into two periods 1967-68 to 1980-81 and 1980-81 to 1994-95. The study revealed that there is a higher level of diversification among all crops as well as within food grains and non-food grains. The productivity growths are observed to be higher during the second period as compared to the first period in more crops exceptionally too and potatoes. Hazra (2001) examined the trend of diversification in Indian agriculture. According to him due to diverse agro-climatic conditions in the country a large number of agriculture are produced which can be classified into two groups – food grains crops and commercial crops. The study concluded that due to wide divergence in agriculture condition, government policies and availability of basic infrastructure induced to the technique of crop diversification in Indian agriculture. Kumar et al. (2002) conducted a study to investigate the extent of profitability, risk and diversification in mountain agriculture of Himachal Pradesh. The agro-climatic conditions in the state are congenial for the production of cash crops like off season vegetables seeds, potatoes and ginger. The study on profitability, risk and impact of diversification suggested that vegetables plus dairy was the most appropriate choice for the farmers of the study area whereby they could increase their farm income by as much as of existing farm income. The study clearly indicated that risk could be notably decreased if the farmers diversify their cropping pattern. Joshi et al. (2004) analyzed the patterns, determinants and policy implications for agricultural diversification in South Asia. According to them the South Asian countries are gradually diversified with some inter-country variations in favour of high value commodities namely, fruits, vegetables, livestock and fisheries. Majumdar (2006) studied the centrality of agriculture in India's economic development. The study examined the vision of agricultural growth in the millennium that it is a means of achieving the broader objectives of food security, employment led growth and poverty reduction. The study reveals that diversification of agriculture is viewed as part of the wider objectives of rural diversification. The livestock sub sector is particularly important because its development will facilitate many marginal farmers – they form 60 per cent of operational holding – crossing the threshold of economic viability.

## RESULTS AND DISCUSSION

Since the agricultural sector accounts for the major share in the net state domestic product and employ more than two times of the working population, its growth is vital for the growth of the district as well as state economy. From this perspective, it is interesting to make a critical appraisal of the changing profile of agricultural diversification in Himachal Pradesh with special reference to district Una.

**Table 1**  
**Changes in Cropping Pattern in Himachal Pradesh**

(Area in hec.)

Year	2001-02		2002-03		2003-04		2004-05		2005-06	
	Area	% to total								
Wheat	374278	38.25	370587	38.73	362680	38.3	366680	12.40	359439	38.02
Maize	3191111	32.14	299906	31.34	298052	31.5	301282	10.19	299801	31.71
Paddy	84939	8.63	79221	8.28	81519	8.6	80580	2.72	83273	8.81
Barley	29295	2.98	25901	2.70	25643	2.7	25017	0.84	25225	2.66
Cereals	831583	84.54	791957	82.77	783609	82.7	787375	26.40	779625	82.48
Pulses	39982	4.06	32556	3.40	31093	3.2	29554	1.00	30128	3.18
Fruits	43671	4.44	57722	6.03	59907	6.3	62416	2.11	61554	6.51
Vegetables	29010	2.95	34675	3.62	33915	3.7	36086	1.22	34289	3.62
Spices	2968	0.30	3995	0.41	4757	0.50	5831	0.19	6978	0.73
Total food Crops	949752	96.56	923939	96.57	916283	96.7	923960	31.25	915508	96.85
Total oilseeds	21235	2.16	18857	1.97	17721	1.87	18178	0.61	17089	1.80
Total Non-food Crops	33847	3.44	32828	3.43	31259	3.3	31780	1.07	29696	3.14
Total Crops	983599	100	956767	100	947542	100	2955740	100	945205	100

Source: Directorate of Land Records; Himachal Pradesh, Shimla – 9

### Changes in Cropping Pattern

A study is now being made for the cropping pattern along with changes there is any brought about by the crop diversification. The study of cropping pattern assume special importance in taking cognizance of soil climate factors and the crops that could be grown within the environment changes in cropping pattern represent response to economic and technology have brought changes in agricultural sector of the country. The farmers have extensively adopted improved seed, irrigation, fertilizer, pesticide technology and the system of multiple cropping. The increasing emphasis on production of per unit of cultivation and per unit of time has compelled the farmers to gradually mechanize their farm to be able to complete farm operation with thoroughly and in time. These developments have led to some changes in cropping pattern and more intensive crop husbandry

practices and raised the level of cropping intensity in the state. A change in cropping pattern has been taking place in the state as elsewhere in the country. The shift in cropping system is normally advantageous and indicates a dynamic economy. The cropping pattern of individual or group of farmers with district determines the aggregate cropping pattern. The district cropping pattern reflects the rational decision of the aggregate of farmers subject to technical and institutional constraints. The slower rate of adoption of new farm technology in the district is a sufficient proof of their cropping pattern behaviour. A change in cropping pattern implies a change in the proportion of area under different crops. Cropping pattern is the only way to determine the extent to which efficient use of land is being made. But in Himachal Pradesh the climate is the great obstacle on the rapid change in cropping pattern. A review of changes in aggregate cropping pattern in Una district during 1997-98 to 2007-08 is presented. The Table 1 presents the details of the main crop with reference to time period under study in Himachal Pradesh. The cropping pattern in Himachal Pradesh is shown by Table: 1.

**Table 2**  
**Area Under Different Crops in District Una**

(Area in hec.)

Year	Rice	Maize	Wheat	Pulses	Potatoes	Oilseed	Linseed	Sea-smum	sugar-cane	Ginger
1997-98	2007 (100)	28487 (100)	32816 (100)	1409 (100)	209 (100)	2088 (100)	7 (100)	785 (100)	821 (100)	10 (100)
1998-99	2114 (105.33)	29719 (104.32)	33482 (102.2)	1280 (90.84)	363 (173.68)	2095 (100.33)	6 (100)	746 (98.21)	658 (80.14)	13 (130)
1999-00	2525 (125.80)	31966 (112.21)	32269 (98.33)	1434 (101.77)	429 (205.26)	2097 (100.43)	7 (100)	771 (98.21)	618 (75.27)	13 (13.00)
2000-01	2592 (129.14)	28084 (98.58)	33083 (100.81)	919 (65.22)	382 (182.77)	2167 (103.78)	5 (71.42)	648 (82.54)	655 (79.78)	25 (250)
2001-02	2677 (133.38)	29518 (103.61)	32696 (99.63)	864 (61.32)	619 (296.17)	2192 (104.98)	7 (100)	709 (90.31)	602 (73.32)	13 (130)
2002-03	2611 (130.09)	28219 (99.05)	31296 (95.36)	753 (53.44)	544 (260.28)	2032 (97.3)	9 (28.57)	615 (78.34)	465 (56.63)	11 (110)
2003-04	3248 (161.8)	27372 (96.08)	31963 (97.40)	654 (46.41)	391 (187.08)	2161 (103.49)	10 (142.85)	603 (76.81)	393 (47.86)	22 (220)
2004-05	2744 (36.72)	29142 (102.29)	36782 (112.08)	682 (48.40)	782 (374.16)	1879 (89.99)	8 (114.28)	669 (85.22)	377 (45.91)	19 (190)
2005-06	2515 (125.31)	28033 (98.40)	29585 (90.15)	705 (50.24)	639 (305.74)	1716 (82.18)	7 (100)	635 (80.89)	319 (38.85)	12 (120)
2006-07	1988 (99.05)	28898 (101.94)	31804 (96.91)	603 (42.79)	792 (378.94)	1938 (92.81)	1 (14.28)	584 (74.39)	211 (25.70)	15 (180)
2007-08	1954 (97.38)	29084 (102.09)	31417 (98.73)	568 (40.31)	866 (414.35)	1991 (95.35)	3 (42.85)	535 (74.52)	193 (23.50)	13 (130)

Source: Data computed from district statistical office Una

**Table 3**  
**Changes in Crop Diversification in District Una**

(Area in hec.)

Sr. No.	Crops	Area under different crops (in hec. (Ai) in 1997-98	Proportion-ate Area under i <sup>th</sup> crop (Pi) <sup>2</sup>	Area under different crops (in hec. (Ai) in 2001-02	Proportion-ate Area under i <sup>th</sup> crop (Pi) <sup>2</sup>	Area under different crops (in hec. (Ai) in 2007-08	Proportion-ate Area under i <sup>th</sup> crop (Pi) <sup>2</sup>
1.	Rice	2007	.0009	2677	.0016	1954	.0009
2.	Maize	28487	.1764	29518	.1764	29084	.1936
3.	Wheat	32816	.2304	32696	.2209	31417	.2209
4.	Pulses	1409	.0004	864	.0001	568	.0001
5.	Potato	209	.0000	619	.0001	866	.0001
6.	oilseeds	2088	.0001	2192	.0009	1991	.0009
7.	linseeds	7	.0009	7	.0000	3	.0000
8.	seasumum	785	.0000	709	.0001	535	.0001
9.	sugar-cane	821	.0001	602	.0001	193	.0000
10.	ginger	10	.0001	13	.0000	13	.0000
	Total	68639	$\sum_{i=1}^n P_{i2} = 0.4093$	69897	$\sum_{i=1}^n P_{i2} = 0.4002$	66624	$\sum_{i=1}^n P_{i2} = 0.4166$

Source: Data computed from district statistical office Una

### Area Under Different Crops in District Una

The table 2 revealed that area under different crops like rice, maize, wheat, pulses, potatoes, oilseeds, linseeds, seasumum, sugarcane and ginger for the period from 1997-98 to 2007-08. It examines the changes in the area under different crops. The study shows that there are some variations in area under listed crop in Table 2 from 1997-98 to 2007-08. The changes in crop diversification in district Una are presented in Table 3. The percentage share of area under different crops in district Una is presented in Table 4, which clearly shows that the area under rice decreased from 1.62 to 1.26 per cent in 2005-06 to 2007-08 whereas area under maize, wheat significantly increased in same time. The area under maize increased from 18.09 per cent to 18.77 per cent and area under wheat increased from 19.09 to 20.27 per cent, whereas area under pulses decreased from 0.46 to 0.36 per cent. The year 2007-08, witnessed one of the best year for the agricultural production. The area in 2007-08 under rice is 1.26 per cent, maize 18.77 per cent, and wheat 20.27 per cent of the total gross cropped area. The area under other crops like potato, oilseed, mustard, seasumum, sugarcane onion has undergone some variations.

From the Table 4 it was concludes that in terms of their claims to total cropped area the leading crops in the district Una 1997-98 were rice, wheat, maize pulses, potato, oilseed, seasumum and sugarcane. The study shows that there has not been any major change in the claims of these crops

over the period of study. But fall in the share of rice and pulses during 1997-2007. The marginal increase in the case of maize and wheat had shown in the table. The cropping pattern of pulses, rice was seen to be erratic, although towards the end, both have the variations. It is also assumed that extension of wheat, maize cultivation came about during the second half where rice registered a decrease. It is clearly concluded that there is a need of policy in context of fair cropping pattern in district Una,

**Table 4**  
**Percentage Share of Area Under Different Crops in Una**

Year	Wheat	Maize	Rice	Pulses	Potato	Oilseed	Mus-tard	Sea-smum	sugar-cane	Onion	Total
1997-98	21.28	18.47	1.30	0.91	0.13	1.35	0.48	0.50	0.53	0.06	46.01
1998-99	21.71	19.27	1.37	0.83	0.23	1.36	0.35	0.48	0.42	0.05	47.27
1999-00	20.93	20.73	1.63	0.93	0.27	1.37	0.53	0.50	0.40	0.05	48.24
2000-01	21.36	18.13	1.67	0.59	0.24	1.39	0.60	0.41	0.42	0.07	45.64
2001-02	21.10	19.05	1.72	0.55	0.33	1.41	0.64	0.45	0.38	0.04	46.15
2002-03	20.20	18.21	1.68	0.48	0.35	1.31	0.54	0.39	0.30	0.04	44.47
2003-04	20.63	17.66	2.09	0.42	0.25	1.39	0.69	0.38	0.25	0.29	45.15
2004-05	23.74	18.81	1.77	0.44	0.50	1.21	0.57	0.32	0.24	0.05	48.76
2005-06	19.09	18.09	1.62	0.45	0.41	1.21	0.79	0.31	0.20	0.10	45.67
2006-07	20.52	18.65	1.28	0.38	0.51	1.10	0.56	0.29	0.13	0.06	46.24
2007-08	20.27	18.77	1.26	0.36	0.55	1.25	0.48	0.28	0.12	0.02	23.94

Source: Data computed from district statistical office Una

### **Cropping Intensity in District Una**

Table 5 reveals the ratio of cropping intensity which was highest in 2006-07 that is 194.8 per cent. The cropping intensity for first five years reveals the highest ratio for the year 1999-00 and similar trend can be seen from the last six years. The highest cropping intensity was noticed in 2006-07, which were 194.8. The cropping intensity was low for the year 2002-03. The reason for low intensity of some years is the lack of basic infrastructure such as irrigation, roads and problem of drought etc. Dry season also affects the production of crops.

### **Irrigation Intensity**

Irrigation plays a decisive role in cropping pattern, intensity of cropping crop combinations, the extent yield and to a certain extent the season of sowing. Besides this the adoption of improved agricultural practices, especially the new varieties of seeds is closely associated with the irrigation facilities to induce the farmers to make use of improved agricultural practices. Irrigation intensity is expressed as a ratio of gross irrigated area to net area irrigated. It is conveniently expressed as percentage and is calculated as under

$$R = \frac{\text{Gross Irrigated Area}}{\text{Net Area Irrigated}} \times 100$$

The Table 6 shows percentage share of irrigated area under some important crops to total irrigated area under different years. In 1997-98 the percentage share of irrigated area under rice, wheat, maize, pulses and sugarcane was 6.44 per cent, 59.15 per cent, 17.35 per cent, 0.72 per cent, 1.01 per cent respectively and in 2001-02 the percentage share of irrigated area under rice, wheat and maize was 11.33 per cent, 47.12 per cent and 23.39 per cent. The percentage share of irrigated area under rice and maize increased whereas the area under wheat was decreased. In 2007-08 the percentage share of irrigated area under rice, wheat and maize was 7.33 per cent, 52.54 per cent and 23.55 per cent. The percentage share of other crops have little contribution to total irrigated area and percentage share of area under irrigation not remained same during the study period.

**Table 5**  
**Cropping Intensity in District Una for the Period 1997-1998 to 2007-08**

Sr. No.	Year	Net area sown	Total Cropped Area	Intensity
1.	1997-98	40743	70939	174.1
2.	1998-99	40644	72889	179.3
3.	1999-00	40252	74382	184.7
4.	2000-01	39329	70668	179.6
5.	2001-02	40579	71500	176.1
6.	2002-03	39994	68906	172.2
7.	2003-04	40503	69955	172.7
8.	2004-05	41091	75554	183.8
9.	2005-06	36879	70760	191.8
10.	2006-07	36769	71640	194.8
11.	2007-08	36769	71469	194.3
	Total	433522	788662	181.9

Source: Data computed from district statistical office Una

### **Agricultural Production of Different Crops in District Una**

Many crops are grown in district Una that is wheat, maize, rice are the important cereals crops of the district. Potato, ginger and sugarcane are the main cash crops and subsistence crops in the district. Rice registered very little preference in the area. Only few of farmers grow paddy crop and production of paddy registered a decrease while other crops registered an increase in their production. The main reason for the low production of paddy is that there is less facility of irrigation. Maximum land of the district is depending upon monsoon and due to the fear of dry season the farmers have less interest in this crop. Moreover, the farmers adopt the traditional method of farming which is the main reason of low production. Rice, Maize, wheat, barley are the cereals, gram, peas moong, tur, urd, mash, kulth and masur are the main pulses under the food grains of the district where potatoes and sugarcane are the main cash crops of the area. The Table 7 shows the total production of some major crops for the period of 1997-98 to 2007-08.

**Table 6**  
**Percentage Share of Irrigated Area Under Major Crops to Total Irrigated**  
**Area in 1997-98 to 2007-08 in Una**

(Area in hec.)

Sr. No.	Years	Rice	Wheat	Maize	Pulses	Sugarcane
1.	1997-98	6.44	59.15	17.35	0.72	1.01
2.	1998-99	7.59	57.90	19.28	0.50	1.19
3.	1999-00	9.24	52.10	21.64	0.90	1.57
4.	2000-01	10.27	51.24	22.43	0.55	1.06
5.	2001-02	11.33	47.12	23.39	0.67	1.22
6.	2002-03	11.56	45.04	23.20	0.39	0.89
7.	2003-04	11.47	41.48	22.28	0.35	1.01
8.	2004-05	12.23	45.31	23.54	0.26	1.10
9.	2005-06	9.14	57.95	24.27	0.33	0.64
10.	2006-07	7.97	54.81	28.10	0.30	0.25
11.	2007-08	7.33	52.54	23.55	0.36	0.15

Source: Data computed from district statistical office Una

Wheat, maize and rice are the main cereals crops of the district. On the whole, wheat and maize production increased in the district. The production of maize in 1997-98 was 39572 metric tones are increased to 57821 metric tones in 2007-08. Wheat production was 46262 metric tones in 1997-98 and is increased to 63464 metric tones in 2006-07. The production of wheat was decreased to 12999 metric tones in 2007-08. The main reason for this uncertainty was monsoon. Production of rice was 2864 metric tones in 1997-98 and was increased to 3093 in 2007-08. The production of barley was 41 metric tones in 1997-98, but the production of this crop was decreased to 1 metric tone in 2002-03. At present, the production of barley is equal to zero because now the barley is not grown in the district. In 1997-98 pulses have the much share of production in the total food grains of the district. The production of pulses in 1997-98 was 565 metric tones and was decreased to 171 metric tones in 2007-08. Total food grain production in the district was 89304 metric tones in 1997-98 and it was decreased to 77686 metric tones. Potato and sugarcane is the main cash crop of the district. The production of potato was 1347 metric tones in 1997-98 and is increased to 5148 metric tone in 2007-08. Whereas the production of sugarcane was 12811 and 3582 metric tones for the years 1997-98 to 2007-08 respectively. The production of spices in 1997-98 was 3 metric tones and was increased to 10 metric tones in 2007-08. The production of oilseed was 1117 metric tone in 1997-98 and decreased to 1011 metric tone. In district the production of total food crops during the study period in 1997-98 was 103465 metric tone whereas in 2007-08 it was 144965 metric tone. The total food and non food crop production of the district during the study period in 1997-98 was 104582 metric tone and is increased to 145691 metric tones in 2007-08. The result regarding production of different crops shows that the production of different crops in the district is decreasing day by day with the effect of new technology used in the agricultural sector of the economy of district Una.

**Table: 7**  
**Production of Major Crops in District Una**

Years	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	CGR
Crops												
Rice	2864	4100	4688	3227	5769	5405	4792	1124	4633	3572	3093	12.8
Maize	39572	40841	41802	22130	56153	52233	56059	12254	72057	64815	57821	7.32
Wheat	46262	17010	69935	19729	38711	40160	39098	43171	46811	63464	12999	3.44
Barley	41	299	7	-	1	1	-	-	-	-	-	-64.21
Pulses	565	373	618	261	393	266	302	171	212	402	171	10.95
Total Food grains	89304	62623	117050	101027	101027	98065	10596	56720	123713	134947	77686	4.94
Potato	1347	1913	10220	3745	3745	7445	2537	3239	7449	9998	5148	32.03
spices	3	5	3	8	8	14	7	4	98	14	10	32.65
Sugar-cane	12811	10568	9595	9924	9924	4293	6479	2572	3096	3096	3582	-15.35
Total food crops	103465	7511	136868	144704	144704	109877	112274	62535	139714	144965	1446965	28.05
Oilseed	1117	1408	1171	1130	1130	799	1056	865	9870	1232	1011	-6.72
Total	104582	75553	138042	115844	115844	110676	113330	113400	140701	146197	145691	3.88

Source: Directorate of Land Records; Himachal Pradesh, Shimla - 9

In district Una the compound growth rate of different crops has also been presented in Table: 7. the table shows that rice has the highest compound growth rate of 12.8 per cent during 1997-98 to 2007-08 followed by maize 7.32 per cent, wheat 3.44 per cent and barley -64.2 per cent. Barley has the negative compound growth rate during the study period because this crop was grown in the district upto 2002-03. The compound growth rate for pulses was 10.95 per cent. The growth rate of total food grains during the study period was 4.94 per cent. Potato is the measure subsistence of the district having 32.03 per cent of the compound growth rate during the study period. The compound growth rate of the spices was 32.65 per cent and for sugarcane was 15.35 per cent. The compound growth rate of total food crop of the district was 28.05 per cent whereas the growth rate of the oilseed was negative (-6.72 per cent) during the study period. The total food and non food crops having 3.88 per cent of the compound growth rate in the study period. The analytical study of the table shows that during the study period only barley sugarcane and oilseed production have negative returns while others have positive results.

### **Changes in the Growth Rate of Area, Production and Productivity**

The changes in the growth rate of area, production and productivity of major crops of the state and district Una during 1997-98 to 2007-08 have been presented in Table 8. The data presented in the table shows the trend in area, production and productivity of four principal cereal crops and the three important cash crops in the H.P. and district Una. Use of high yielding variety of seeds and improved technology has not brought any different type of change in the production and productivity

of cereal crops in the state as well as district Una. In Himachal Pradesh the productivity of wheat and maize was 2091 kg/hect. and 1395 kg/hect. in 1997-98 was decreased to 1598 kg/hect. and 1385 kg/hect. in 2007-08 respectively. In district Una the productivity of maize and wheat in the same year was 1400 kg/hect. and 1409 kg/hect. The productivity of maize has increased to 1626 kg/hect. But the productivity of wheat has been decreased to 410.8 kg/hect. in 2007-08 due to the adverse affect monsoon. The productivity of paddy was 1293 kg/hect. in 1997-98 and it was decreased to 1031 kg/hect. in 2007-08 in the state, whereas in district Una the productivity of Paddy in the same period was 1391 kg/hect. and 2035 kg/hect. respectively. There has been a registered fall in production and productivity of paddy crop due to less irrigation facility, use of traditional system of farming, lack of HYVs and lack of other basic infrastructure regarding agriculture in the state. Barley is another cereal crop of the state and district Una. The productivity of this crop was 1302 kg/hect. in 1997-98 which was decreased to 857 kg/hect. in 2007-08 in the state, whereas in district Una the productivity of Barley was equal to zero. The main reason for the fall in production of barley is that most of the farmers had been shifted their land from barley to other cereal crops because barley is considered as an inferior crop in the state. The productivity of potato in 1997-98 was 7276 kg/hect. and it was increased to 12376 kg/hect. in 2007-08 in the state whereas in district Una it was 6500 kg/hect. and decreased to 6375 kg/hect. in the same period. From the state point of view, the production and productivity of potato is increasing day by day. The potato is considered a subsistence as well as commercial crop of the state and district Una apple and ginger are the other cash crops of the state. The productivity of Apple and ginger in 1997-98 was 3582 kg/hect. and 6763 kg/hect. which was increased to 3751 kg/hect. and 7083 kg/hect. respectively in 2007-08. In Una district the production and productivity of both of these crops was equal to zero in the same period. Table: 8 further shows that maximum change in the productivity of potato was noticed in the state (i.e. 70.42 per cent) during the study period and it was negative for barely (i.e. - 34.17 per cent) whereas in district Una it was highest for paddy (i.e. 46.29 per cent) and negative in wheat (i.e. -70.90 per cent during the study period.

## CONCLUSIONS AND POLICY IMPLICATIONS

In nutshell, it can be concluded that the crop farming level, some structural changes has taken place in the study area, although the process has been rather slow. Only some reallocation of land, has taken place mainly from pulses to cereals. The remaining crop categories had by and large, maintained their relative position in the total area shown. Thus the cereals wheat, maize and rice still dominate the cropping pattern even in though of introduction of the technique of agricultural diversification. There is also some evidence of a small rise in the share of vegetables and oilseeds in area shown. The statistical results show that there exists complete diversification of agriculture in Himachal Pradesh as well as in Una district. The value of the Herfindhal diversification index remains equal to zero. This shows that the economy of Himachal Pradesh and district Una are diversified gradually day by day. In 1997-98 the total production of cereals in Una was 88739 metric tones. The percentage share of production out of total cereals for wheat and maize was 52.1 per cent and 44.59 per cent during the study period which was 48.13 per cent and 49.15 per cent in 2006-07. In this period the production of wheat decreased and maize have an increase rather than previous year. In 1997-98 the production of total pulses was 565 metric tones which were decreased to 171 metric tones in 2007-08. This decrease accrued due to the shift of pulses into cereals crops. The production of total food grains in 1997-98 was 89304 metric tones which were increased to 77666 metric tones in 2006-07. The vegetable production in Una district have been increased from 1347

**Table 8**  
**Trends in Area, Production and Productivity of Selected Principal Crops of Himachal Pradesh and District Una**

Crops	Area (000 ha.)						Production (000 MT)						Productivity (kg./hec.)					
	H.P.			Una			H.P.			Una			H.P.			Una		
	1997-98	2007-08	(%) Change	1997-98	2007-08	(%) Change	1997-98	2007-08	(%) Change	1997-98	2007-08	(%) Change	1997-98	2007-08	(%) Change	1997-98	2007-08	(%) Change
<b>Maize</b>	309.4	299.8	-3.10	2.00	1.95	-5.00	647.1	499.2	-25.94	2.86	3.09	7.14	2091	1598	-23.57	1400	1626	16.14
<b>Paddy</b>	83.04	80.50	-3.01	28.48	29.08	3.50	107.3	85.65	-20.22	39.57	57.82	46.32	1293	1031	-20.26	1391	2035	46.29
<b>Wheat</b>	357.7	369.4	0.47	32.81	31.42	-4.26	499.1	495.5	-0.72	46.26	12.99	-72.07	1395	1385	-0.71	1409	410.8	-70.90
<b>Barley</b>	35.70	23.5	-34.17	0.03	-	-	45.10	30.61	-32.15	0.04	-	-	1302	857	-34.17	-	-	-
<b>Potato</b>	18.7	12.5	-33.15	0.21	0.86	300.00	136.8	154.7	13.91	1.35	5.15	400.00	7262	12376	70.42	6500	6375	-19.23
<b>Apple</b>	82.30	92.8	12.70	-	-	-	294.8	348.2	18.11	-	-	-	3582	3751	4.71	-	-	-
<b>Ginger</b>	1.7	2.45	41.17	1	3	200.00	11.52	17.05	47.82	-	-	-	6765	7083	4.70	-	-	-

Source: Directorate of Land Records; Himachal Pradesh, Shimla – 9 and District statistical Office, Una

metric tones in 1997-98 to 2686 metric tones in 2006-07. In brief, the total production of food and non food crops in district Una was 104582 metric tones in 1997-98 which was increased to 146197 metric tones in 2006-07.

In district Una the compound growth rate shows that rice has the highest compound growth rate of 12.8 per cent during 1997-98 to 2007-08 and followed by maize 7.32 per cent, wheat 3.44 per cent and barley -64.2 per cent. Barley has the negative compound growth rate during the study period because this crop was grown in the district upto 2002-03. The compound growth rate for pulses was 10.95 per cent in a decade. The growth rate of total food grains during the study period was 4.94 per cent. Potato is the measure subsistence and commercial crop of the district having 32.03 per cent of the compound growth rate during the study period. The compound growth rate of the spices was 32.65 per cent and for sugarcane was 15.35 per cent. The compound growth rate of total food crop of the district was 28.05 per cent whereas the growth rate of the oilseed was negative (-6.72 per cent) during the study period. The total food and non food crops having 3.88 per cent of the compound growth rate in the study period. The analytical study revealed that during the study period only barley sugarcane and oilseed production have negative returns while others have positive results.

From the study it has been found that there are some constraints in the agricultural sector of Himachal Pradesh as well as in district Una. Himachal Pradesh is one of the state, which could not be much benefited through new farm technology. This has been mainly due to poor production base in terms of irrigation facilities, mountainous topography etc. consequently the growth in agricultural sector remained almost stagnant and the state had to depend heavily on food grains inputs from other states to feed its ever increasing population. Stagnancy in net area sown and cropping intensity may also be attributed to the limited alternative use of land due to rainfall conditions. On the basis of constraints and findings the following measures may be suggested for the diversification of the agricultural economy in the state as well as in the district Una:

- There is good deal of skewness in the size distribution of ownership holdings and operational holding in the district. To hasten agricultural diversification in the agriculture sector redistribution of land in favour of small and marginal farmers is a prerequisite. Another alternative could be to provide non agricultural employment to small and marginal farmers so that the average size of agricultural holdings gets increased.
- The farmers in the district have shown a preference for cereals crops. The policy makers should provide adequate incentives for the promotion of other crops categories like vegetables, oilseeds etc. Being cash crops these will improve the financial position of the farmers.
- Horticulture has almost been neglected in this district, fruits like mango, grapes, patharnakh, keno and lemon have got much production potentials in this district due to its geographical proximity to the plains of Punjab. Besides, fruits crops also economize the use of land, which is more scarce factor of production in Una.
- Although the district agricultural department has done a lot of work in distributing HYVs, yet crop like paddy have not shown much increase in area devoted to it. Thus paddy should also promote specially through provision of more irrigational facilities.
- However, for bringing about a rapid development of diversification in the agriculture sector of the district, it is necessary that institutional changes like land reforms should be brought about. Besides institutional support through agencies like the SFDA and IRDP etc. should

be made available to the small and marginal farmers who are the most numerous in the district.

- To strengthen the process of agricultural diversification, the necessary steps should be taken by the agricultural department of district Una in providing basic infrastructure to the farmers for agricultural development.

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