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Research Paper

Trends and Patterns of Agricultural Growth in North-West Himalayan, India.
(1986-87 to 2005-06)

Dr.Jigmat Norboo
Assistant Professor, Department of Geography, Kargil Campus,
University of Ladakh, UT Ladakh, India.

Abstract:
Thepresent study discusses the trends and patterns of agricultural growth in North-West Himalaya, India. Data on important variables likearea, production and yield of various crops were compiled for the years 1986-87 to 2005-06 from published sources. The analysis shows that the production of food grains has not declined as is often thought but food grain production may decline in the future because of the shift to cash crop farming. From the cropping pattern changes of these crops, it can also be said that the growth of rice is slowed down and other crops like oilseeds and potatoes are emerging after 1993-96 which means that the agriculture in North-West is diversifying towards horticulture and cash crops. Furthermore, the growth of area, production and productivity of various horticulture crops in North-West Himalayan states during 2006 to 2010 has been increasing from year to year. It is due to the reason that mountain farmers diversified towards horticulture and cash crops after liberalization. Among the North-West Himalayan states, Himachal Pradesh has witnessed a phenomenal increase in fruit production over last two decades. The average annual growth rates in the area, production and productivity of various fruits and vegetables between 2006 and 2010 shows positive growth rate.It is due to availability of irrigation facility and also because of high returns from these crops in the domestic and international market.

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I. Introduction:

Agriculture in mountains exhibits a unique system of harnessing a local mountain niche by adopting a subsistence which is compatible with the mountain specificities. To be specific mountain agriculture is broadly defined as *covering all land-based activities such as cropping, animal husbandry, horticulture, forestry, etc., as well as water harvesting and a variety of conservation practices*[1].These activities form the main source of livelihood for mountain people. Nevertheless, the nature of agriculture is still traditional and isof subsistence type. Various socio-cultural and technological advancements have been made in recent years to make agriculture in mountain areas more remunerative. This has enabled farmers to bring diversification and increase in agricultural growth and in greater economic returns, which, in turn, led to increase in the demand of inputs in agriculture.

The growth of agriculture is highly variable annually but its decadal growth rate gives us a clear picture of advances made by agriculture in economy.Application of modern technology has been seen by most of agricultural scientists as a mean to minimize the natural control over agricultural growth which has been achieved up to a limit through development of irrigation infrastructure and application of fertilizers and pesticide etc.Bhalla and Singh (1997), in their study on the patterns and trends of growth of agricultural sector found, "growthof landproductivity andof output, attheall-Indiaandatthestate levels,are positively associated with the use of moderninputs.The modernization of agriculture helps in stabilization of agricultural production and

[1] Presidential Address delivered at the 68th Annual Conference of the Indian Society of Agricultural Economics held on November 28, 2008 at Andhra University, Visakhapatnam.

provides partial immunity from abnormal monsoonal conditions but it does not mean that agriculture will keep on growing. There are limits to application of modern implements in agriculture. In the initial stage, the application of modern technology cause higher growth due to higher potential but as soon as potential is utilized agricultural growth tends to decelerate as found by Bhalla and Singh (1997) and Chand et al. (2007) in their studies on state wise analysis of agricultural growth. Well, in these two studies, it is clearly mentioned that the development of agricultural infrastructure and application of modern agricultural technologies varied spatially and temporally among the states which created huge regional imbalances.

The later trends of growth have been drawn by Chand et al. (2007) who related liberalization of economy with agricultural growth.They raised concerns over increasing income gap between agricultural and non-agricultural sector as a result of acceleration of growth in non-agricultural growth and deceleration of agricultural growth. This study then came to conclusion that due to fall in public investment on agricultural infrastructure, the agricultural growth is decelerating, especially after 1995-96. This study accused international exposure to Indian agriculture as a factor causing fall in prices of agro-commodities which has resulted as a deterrent to agricultural growth. Bhalla and Singh (2010) raised similar concerns over impacts of liberalization on Indian agriculture. They found that the growth rate in the agricultural production and yield have slowed down after liberalization than before in various regions studied. It can be argued here that the growth rates of agriculturally backward regions keep on fluctuating and the agricultural potential of agricultural developed regions has been largely utilized, so, it is obvious that the growth rates will decelerate. They found, "*These growth rates are lower than the growth rates in rural population and workforce employed in agriculture…This seems to be one of the factors for rising rural and agricultural distress in the country. Accordingly, a downward trend in international prices of agricultural commodities after 1997-98 has been transmitted to domestic prices resulting in deterioration in Terms of Trade for agriculture… At the state level, the growth rate has turned negative in four out of 20 major states while six states show a growth rate ranging between 0.10 and 0.95 per cent.*"

Therefore, agriculture growth has three major components i.e. growth of production, changes in cropping pattern and changes in productivity. These components are affected by various factors like rainfall, irrigation, fertilizer usage [Chand et al., 2007] and international prices [Bhalla and Singh, 2010]. This implies that the government policies and level of dissemination of technology and market price of the crop determines the level of growth among various crops.

II. Aim and Objectives:

Keeping in the view of aspects of current scenario of agricultural production and growthin north-west Himalayan states, the following objectives have been taken into consideration.

1. To examine the level and growth of aggregate crop output and yield at the state level of North-West Himalaya in India during 1986-89 to 2003-06.
2. To characterise the present patterns of mountain agricultural systems in terms of cropping systems and productivity;

Study Area:

The North-West Himalayas are comprised of states of Jammu & Kashmir (J&K), Himachal Pradesh (H.P) and Uttarakhand (UA). Geographically, it spreads between 28º 0' 43" to 37º 0' 05" N latitude and 72º 0' 40" to 81º 0' 02" E longitude covering an approximate area of 33 million hectare contributing about 10 per cent of total geographical area of the country. It is a mountainous region transacted by a number of mountain ranges, rivers and rivulets originating from the region.Agriculture in North-West Himalayan states is subsistence in nature mainly to meet the livelihood, fuelwood, fodder and food requirements of the households. In the North-West Himalayan states wheat is the main crop followed by rice and maize. Apart from agriculture, animal husbandry forms the main economic activity in meeting the livelihoods of the resource-poor farmers. Besides these two activities, horticulture and agroforestry hold promising potentials in the region, which need to be harnessed through strategic approaches.

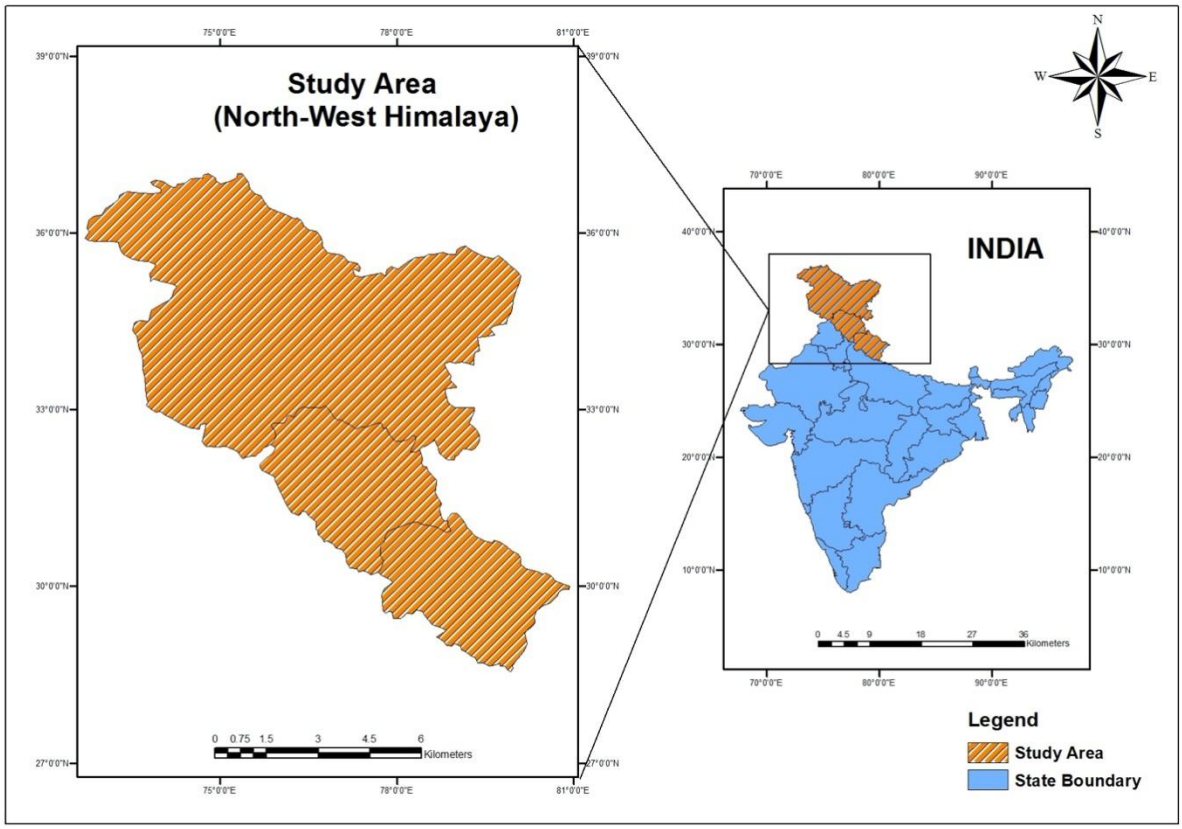


Figure 1. Study Area: North-West Himalaya (India)

III. Data Base and Methodology:

A broad range of data related to mountain agriculture has been collected from Directorate of Economics and Statistics, Ministry of Agriculture (MOA), New Delhi on area, production and yield of various crops at the state levels.

The present study is an analysis of the patterns and trends of agricultural growth in the North-West Himalayan states. Regression lines have been drawn on the area production and yield data from 1986-87 to 2007-08 to know a general trend of growth rate.

Statistical tools have been used at different stages of analysis in the study which are given below as:-

1. Growth rate is calculated to know any acceleration or deceleration in growth rates as follows:-

The Log Lin Model (Semi Log Model) have been used to estimate compound growth rates of area, production and yield between 1986-87 t0 1995-96 and 1996-97 to 2005-06.

$$Y_t = \beta_1 + \beta_2\, t + u_t$$

The unpractical trends in area, production and yield were adjusted according to concept adjusting method considering such unrealistic trends as a result of changes in definition and concept of measurement. Due to lack of trends, use of extrapolation or interpolation was not possible; therefore, concept adjustment method was used.

IV. Results and Discussion:

Firstly, we will be discussing the aggregate growth rate of area, production, yield and changes in cropping pattern in North-West Himalayan states which will give us a clear pictureof the aggregate condition of agriculture in North-West Himalayan states. Then each of these growth rates in area, production, yield and changes in cropping pattern will be compared state-wise.To see the changes in cropping pattern, changes in the area of various crops will be analyzed. After analyzing the complete condition of growth pattern in various states and crops, we will be running a regression equation to know the dependence of production on either changes in area or yield. To see the relative changes in the growth of various states, the incremental output growth will be analyzed.This will give us a scenario adopted by Bhalla and Singh (1997) for analyzing the trends and patterns growth in Indian agriculture from 1960 to 1995.In this study, nine crops have been selected for this exercise i.e. rice, wheat, bajra, barley, maize, total pulses, total oilseeds, sugarcane and potato. So, any regional average will be based on aggregation of these major crops.

***Regional Overview*:**

North West Himalayan States has remained under an agricultural impasse in the phases of green revolution due to non percolation of green revolution technology to this region as initially HYV technology was only developed for wheat [Bhalla and Singh, 1997] and under-development of irrigation facilities in this region acted as a major deterrent in adopting green revolution technology as HYV seeds demand timely and appropriate amount of water which is possible by irrigation, especially tube well irrigation. With the adoption of modern implements, it has been seen that per hectare consumption of fertilizers increased from 64.41 kg during 1996-99 to 81.64 kg in 2001-02.Therefore, it can be said that at some parts of the North-West Himalayan states there is increase in agricultural growth from 1990 onward due to adoption of new technology.

Table: 1
Growth of Major Crops in North-West Mountain States

Years[2]	1986-89 to 1993-96	1996-99 to 2003-06
GCA	-38.01	-2.99
Production	24.79	2.08
Yield (Kg./Ha.)	23.7	-43.81

Source: Calculated from APY, DES, MOA, Govt. of India.

Table.1 shows that the growth trends in North-West Himalayan states where it shows high growth in production (24.79 per cent) and yield (23.70 per cent) of selected crops during 1986-89 to 1993-96 decade. This signifies the importance of 1986-96 decade in the history of North-West Mountain states.These growth rates slowed down after 1996-99 as can be seen in the table.1. On the other hand, GCA showed negative growth rate (-38.01) from 1986-89 to 1993-96 decade.This picture varies from crop to crop and state to state in North-West Himalaya. One thing is sure from this regional overview that the production of the major crops has grown fast enough from 1986-89onwards. GCA growth showed negative and fluctuating trend and yield showing a positive growth rate, means that, the role of GCA in production has been diminishing and of yield increasing, as argued by Bhalla and Singh (1997) based ontheir findings on growth of area, production and yield. This picture may vary from state to state and crop to crop in eastern India. Growth rate in area, production and yield of major crops of the region during 1986-96 to 1996-2006 are shown in Table 2. The area under rice, wheat, bajra, barley, maize and potato has increased during this period while total oilseeds and sugarcane has been decreased in the same period. The rate of yield of crops has been increasing, maximum being in potato and wheat and the least in rice.

Table: 2
Crop-wise Growth Rate of Area, Production and Yield in North-West Himalaya

	Area ('000Hectares)		**Production ('000Tonnes)**		**Yield (Kg./Ha.)**	
	1986-96	1996-2006	1986-96	1996-2006	1986-96	1996-2006
Rice	-0.06	72.78	3.49	-0.45	9.2	5.67
Wheat	-64.07	-13.5	31.31	8.27	33.80	10.01
Bajra		46.85		72.22		-15.82
Barley	-17.46	1.82	-5.95	-7.32	10.41	1.42
Maize	2.60	1.69	30.20	5.37	26.77	-17.67
Total Pulses	-14.04	-13.37	-4.24	-2.09	10.25	12.09
Total Oilseeds	1.60	-14.21	0.88	12.04	11.56	3.06
Sugarcane	-5.94	-18.91	47.14	-60.15	15.88	-68.38
Potato	-2.06	-1.49	125.33	-6.45	81.88	1.46

Source: Calculated from APY, DES, MOA, Govt. of India.

Table.2 gives us an idea about the role of growth of area or yield in the growth of total production of the individual crop and crop groups. The relation between area, production and

[2]1986 means average of 1986, 87 and 88. In the same way, other years represent average of three consecutive years in all growth tables.

yield of rice shows that in the initial years of growth of production, decline in the growth of area under rice which is (-0.06) and growth of production is slightly higher than the growth in area, growth of yield has increased. In the later periods i.e. 1993-96 to 2003-06, there was rise in area under rice (72.78 per cent) and the production falls.

It can be seen from the above table that growth of wheat is dependent on growth in yield than area as growth of 33.80 per cent yield of wheat showed a 31.31 per cent growth in production instead of negative growth in area under wheat during 1986-89 to 1993-93. This condition also prevailed in the later periods. The trends in total pulses, total oilseeds, sugarcane and potato also shows that decline in the area under these crops do not shows equal decline in production due to increase in the yield/hectare of these crops. The trends in pulses, oilseeds, coarse cereals and sugarcane shows that decline in the area under these crops do not showsequal decline in production due to increase in the yield/hectare of these crops. On the other hand, increase in the area under these crops did not show equal increase in the growth of production as yield was negative e.g. barley show a growth of -17.46% in area during 1986-89 to 1993-96 but growth of production was only -5.95% which have been caused by increase in the yield of coarse cereals by 10.41% during this period. On an average, as discussed earlier, the trends of growth of major crops were characterized by the diminishing dependence on the growth in area and increasing dependence on the growth of yield.

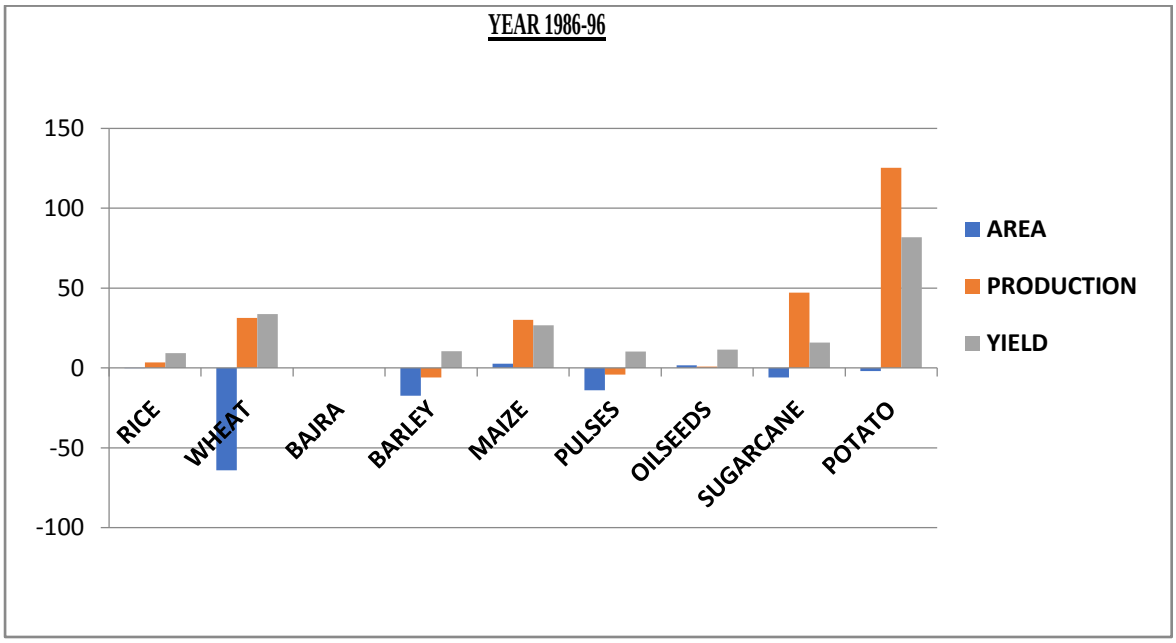


Figure 2. Crop-Wise Growth Rate of Area, Production and Yield in North-West Himalaya

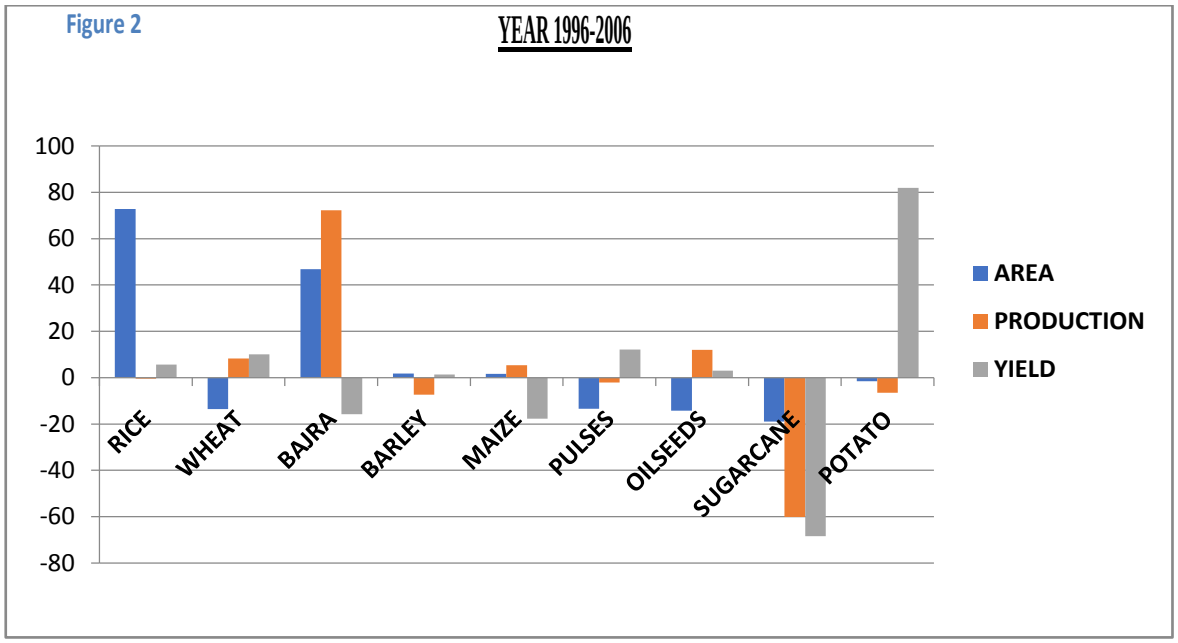


Figure 3. Crop-Wise Growth Rate of Area, Production and Yield in North-West Himalaya

State Level Analysis

Aggregate of all Crops

It was found that the trends of growth of selected crops varied largely. Table.3 gives us a clear idea about growth of gross cropped area under selected crops, growth of production and yield of the selected crops.The area under selected crops recorded a positive growth in Jammu & Kashmir after that period it decline -0.21% after 1996-99. The other state recorded a reverse trend as of Jammu & Kashmir. They showed negative growth in area under selected crops after 1986-89 but recorded slightly higher growth after 1996-99. The growth of production from 1986-89 in Himachal Pradesh and Jammu & Kashmir is 33.31% and 17.23% respectively which is positive trend but after that it declined in the next decade.

The yield in both the states has been widely varied from decade to decade. Himachal Pradesh shows a positive growth rate of 91.94% in yield during 1986-89 to 1993-96. Table.4 shows growth rates of area, production and yield of crops (or crop group) selected in Himachal Pradesh and Jammu & Kashmir. This shows that sugarcane has come up in a major way in

Table: 3	Growth of Major Crops in Himachal Pradesh		Growth of Major Crops in Jammu &Kashmir	
Years	1986-96	1996-2006	1986-96	1996-2006
GCA	-56.32	-6.04	1.22	-0.21
Production	33.31	-0.81	17.23	5.3
Yield (Kg./Ha.)	91.94	-5.3	-32	-56.31

Source: Calculated from APY, DES, MOA, Govt. of India.

Himachal Pradesh as sugarcane production in H.P has grown very fast between 1986-89 and 1993-96 though sugarcane has experienced negative growth rates in production, area and yield after 1993-96. Growth rate of area under potato has been increased while there is decrease in other important crops. These changes in land use pattern signal towards the diversification of agriculture in Himachal Pradesh after 1993-96. After 1993-96, food grain production and yield have been fluctuating over the years whereas the total area under cultivation has remained almost the same except rice which is -34.75%. The year 2001-01 recorded exceptionally low production and productivity because of drought conditions in both *Kharif* and *Rabi* seasons. (H.P. Development Report)

Jammu & Kashmir shows increase in the growth of area and production during 1986-96 to 1996-2006 of food grains crops with production of barley is 80% but area under rice recorded a slight negative growth. The yield of barley, oilseeds and potato showed increase growth after during the same period.

Aggregating both states, it was observed that the growth rates in area undervarious crops was fluctuating from one period to other but yield of some crops showed a positive growth. From 1986-96 to 1996-2006, the yield of almost all crops has declined except potato and rice in Jammu & Kashmir. It can be said from the analysis that North-West Himalayan states showed a fluctuating trend of production and yield as irrigation

infrastructure was not developed. The area and production of barely, bajra and oilseeds showed a positive growth after 1993-96 whereas production of wheat and rice recorded negative growth in Jammu & Kashmir while it has declined in Himachal Pradesh. On a whole, the agriculture in Jammu & Kashmir and Himachal Pradesh diversified towards horticulture crops after 1993-96.

Bhalla and Singh (1997) attributed this diversification after liberalization to the changes in profitability due to prices of oilseeds, fruits and vegetables. The other explanation given by them was that the farmers can't afford high input cost in the time of falling prices in the influence of international prices after liberalization. The relative growth of area, production and yield can be understood easily by looking at the trends plotted on the given Table 4.

Table: 4

Compound Growth Rate of Area, Production and Yield

		Area ('000 Hectares)		Production ('000Tonnes)		Yield(Kg/Hectare)	
State	**Crop**	**1986-87 to1995-96**	**1996-06**	**1986-96**	**1996-06**	**1986-96**	**1996-06**
Himachal Pradesh	**Rice**	0.18	-34.75	20.66	2.27	32.28	5.76
	Wheat	-74.62	-2.73	17.84	2.60	16.23	5.66
	Bajra		28.57				-35.88
	Barley	-18.55	-8.84	-4.61	-17.21	16.30	-8.42
	Maize	2.50	-0.68	35.49	6.76	32.31	7.30
	Pulses	-14.72	-15.30	52.60	26.55	78.87	50.18
	Oilseeds	-4.30	-13.27	68.42	-7.04	74.39	1.65
	Sugarcane	1.17	-19.04	117.50	-58.43	107.26	-49.13
	Potato	-2.31	0.73	0.78	-4.33	145.00	-7.54
Jammu & Kashmir	**Rice**	2.87	-5.18	0.58	-1.05	-2.11	5.61
	Wheat	0.98	2.30	56.48	17.01	55.06	14.42
	Bajra	-11.65	47.26	31.94	74.52	48.86	18.63
	Barley	-13.68	37.65	-13.93	80.00	0.26	27.24
	Maize	2.72	4.07	24.09	3.55	20.66	-50.71
	Pulses	-13.33	-11.26	-20.65	-21.82	-8.85	-11.81
	Oilseeds	3.56	-14.46	-6.46	15.75	-9.50	6.62
	Sugarcane	-43.75	-16.66	-47.50	-90.00	-7.26	-87.36
	Potato		-17.24	-32.17	-25.00	-31.33	12.97

Note: 1986 means average of 1986, 87 and 88. In the same way, other years represent average of three consecutive years.
Source: Calculated from APY, DES, MOA, Govt. of India.

Cropping Patterns

Cropping pattern of a region is determined by a variety of factors, most notably, elevation, topography, precipitation, and so on. The climate of mountain states in India is conducive for growing a large number of high-value cash crops such as cardamom, potatoes, ginger, and numerous other horticultural crops despite their constraints. In general, while the lower elevations grow paddy and fruits such as apples, the higher areas in these states produce maize, potatoes and wheat. The major food crops grown in the area are food grains (rice, wheat, bajra, barley, maize), pulses, oilseeds, sugarcane, potatoes and other vegetables, and fruits. These are intra and intercropped in various combinations.

The general trend in major food grain crops has been analysed by estimating the average annual growth rates in the area under cultivation, total production, and average yield per hectare of major crops in three North-West Himalayan states. The area under rice and maize declined or remained nearly constant in all states, and the area under wheat remained virtually constant in. This reduction in area may have reflected a shift towards cultivation of cash crops as fruits and vegetables. The yields of all food grains crops increased in H.P as did those of wheat in Uttarakhand, and of rice in J&K. But the yields of maize in Uttarakhand, and of wheat and maize in J&K, actually declined.

Horticulture Crops

It has been observed that 'Mountain Agriculture' is gradually diversifying in favour of fruits and vegetables. Mountain states have potential for production of vegetables in Off-season that has higher demand in neighbouring states when there is scarcity of supply. The crops include fruits such as apples, citrus, walnuts and mangoes; vegetables such as potatoes, tomatoes, peas and cabbages are growing in these mountain states. The total area under fruits and vegetables in the north-west mountain states is estimated to be around 16 per cent of the gross cropped area and it has been growing rapidly with fastest growth in Himachal Pradesh which has witnessed a phenomenal increase in fruit production over the last two decades. Himachal Pradesh and Jammu & Kashmir are considered the fruit baskets of the region because of favourable climate and topography.

Table:5
Percentage of Growth of Horticulture Crops in North-West Himalaya

A=Area ('000Ha.), P=Production ('000MT), PRO.=Productivity (Kg./Ha.)									
Crop (Fruit/Veg.)	**07-08** over 06-07			**08-09** over 07-08			**09-10** over 08-09		
	A	**P**	**PRO.**	**A**	**P**	**PRO.**	**A**	**P**	**PRO.**
Apple	4.67	23.40	18.32	4.16	-0.81	-5.30	2.43	-10.54	153.42
Mango	2.14	-4.81	-5.88	1.10	27.62	35.51	1.04	-30.06	-43.44
Citrus	2.39	9.67	0.41	1.98	1.96	0.4	0.62	-0.44	
Other Fruits	12.23	22.13	17.04	-7.66	-2.04	1.61	22.36	0.20	-18.15
Peas	3.01	-21.95	-55.12	10.06	15.27	16.97	18.31	8.95	-21.72
Tomato	2.08	-6.54	-22.34	5.61	13.69	5.14	27.19	18.39	-7.34
Cabbage	4.20	3.26	2.98	33.33	31.06	-5.51	-1.28	3.62	8.02
Potato	11.02	7.22	-18.62	9.93	5.01	-4.72	0.48	-7.44	-5.47

Source: Calculated from National Horticulture Board, MOA, Govt. of India.

The growth of area, production and productivity of various horticulture crops in North-West Himalayan states during 2006 to 2010 is given in the table.5. It seems from the table that area and production of almost all crops has been increasing from year to year. It is due to the reason that mountain farmers diversified towards horticulture and cash crops after liberalization.

Table: 6
State-wise % age Growth of Major Horticulture Crops

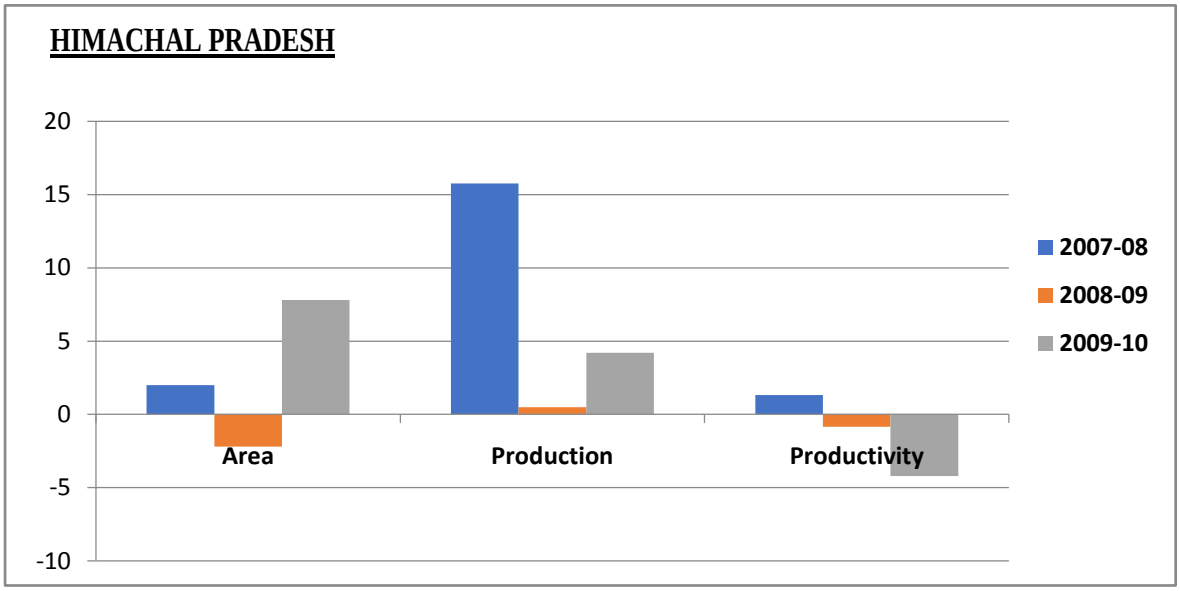
Himachal Pradesh			
Years	**07-08** over 06-07	**08-09** over 07-08	09-10 over 08-09
Area	2.00	-2.19	7.80
Production	15.76	0.48	4.20
Productivity (Kg./Ha.)	1.32	-0.85	-4.20
Jammu & Kashmir			
Area	14.94	8.46	41.34
Production	-0.99	15.03	2.30
Productivity (Kg./Ha.)	-42.31	4.91	-16.02
Uttarakhand			
Area	2.83	0.28	8.70
Production	3.85	2.73	-5.26
Productivity (Kg./Ha.)	0.26	2.81	-7.13

Source: Calculated from APY, DES, MOA, Govt. of India.

Himachal Pradesh has recorded highest growth rate of fruit and floriculture crops in area and production and second in vegetable production (Sharma et al., 2003). The state has witnessed a phenomenal increase in fruit

production over last two decades. Table.6 and figure.3 shows the average annual growth rates in the area, production and productivity of various fruits and vegetables between 2006 and 2010. The growth of area under fruits and vegetables increased in the last few years which are clear from the table.6 that growth of area under these crops was 2.00 per cent in 2007-08 and it increased to 7.80 per cent in 2009-10. It is due to availability of irrigation facility and also because of high returns from these crops.

Figure 4: % age Growth of Major Horticulture Crops (Himachal Pradesh)



In Jammu & Kashmir growth of area under fruits and vegetable has increased from 14.94 per cent to 41.34 per cent during 2007 to 2010 but growth of production and productivity of these crops declined in the same period due to other states produced more quality fruits and vegetables.

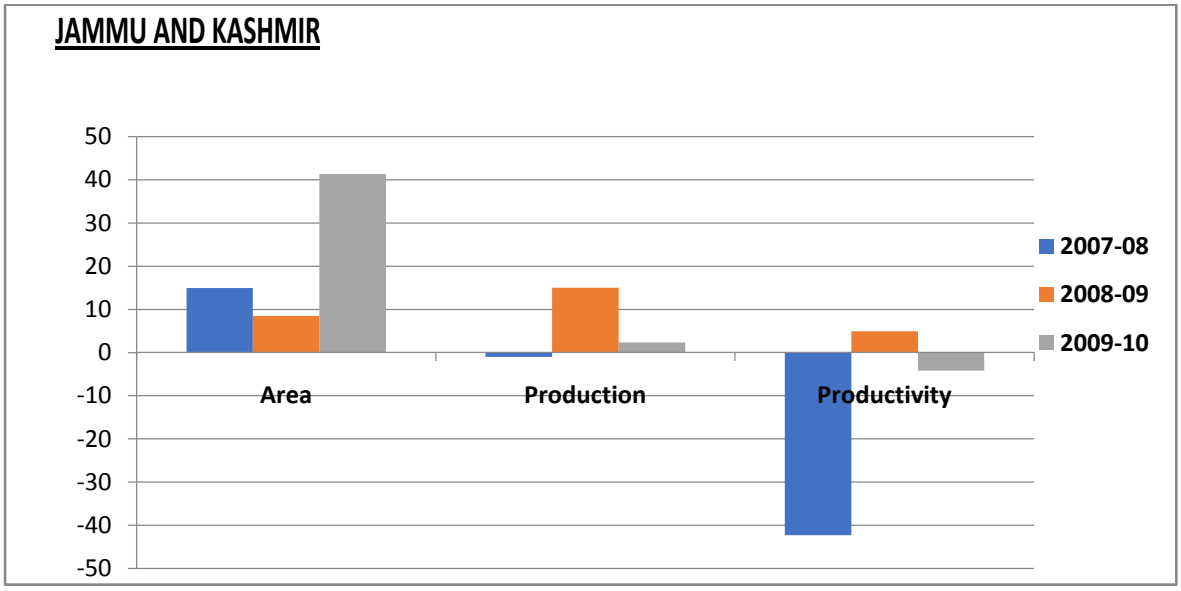


Figure 5: % age Growth of Major Horticulture Crops (Jammu and Kashmir)

Uttarakhand have also diversified into the production of fruits and vegetables. The area under these crops has been increased from 2007-10 as clear from the figure.5 but at the same time production and productivity is in negative.

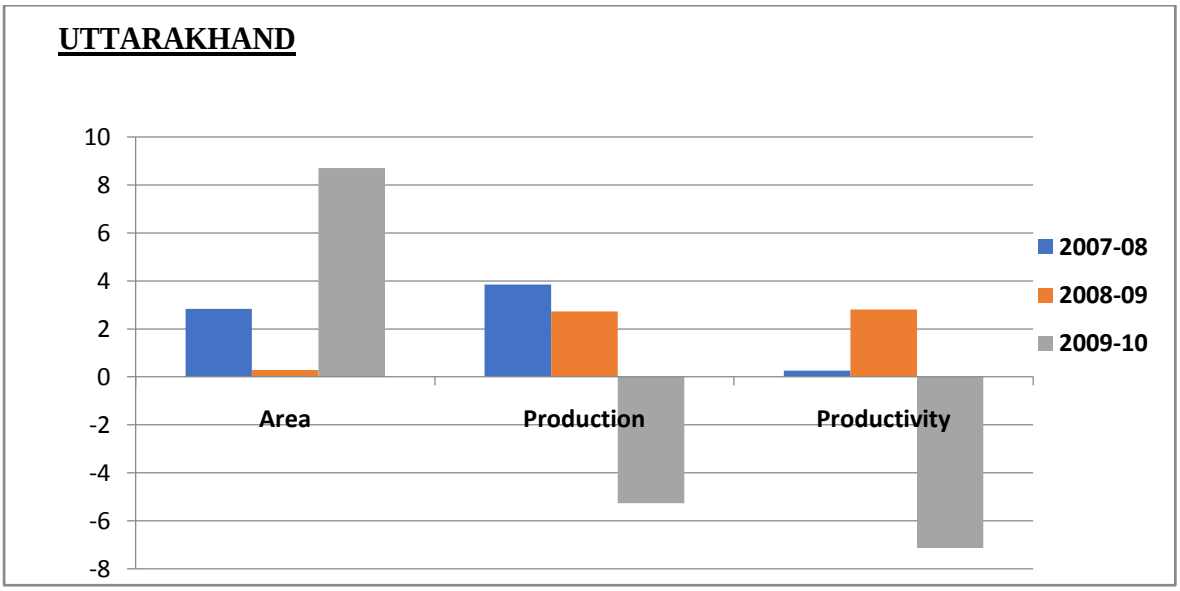


Figure 6: % age Growth of Major Horticulture Crops (Uttarkhand)

V. Conclusions:

From the growth trends drawn in the above analysis, it can be culminated that the extension of green revolution did not help much to the North-West Himalayan states except some pockets of Himachal Pradesh. The introduction of HYV seeds, use of fertilizers and provision of assured irrigation have given a boost to agricultural growth in the region but only at some extend while, some pockets of Uttarakhand have very low agricultural growth due to small and fragmented land holdings, low use of quality seeds, limited irrigation facilities, lack of extension and low farm mechanization. The analysis shows that the production of food grains has not declined as is often thought but food grain production may decline in the future because of the shift to cash crop farming.

Rice as a major crop of Jammu & Kashmir has recorded high growth rate but has slowed down after 1993-96.The dependence of growth of production of all crops at regional as well as state level on growth of area has diminished and on growth of yield has increased. Barley has emerged as a major beneficiary in Jammu & Kashmir as growth rate of barley production have been very high after 1986-89 to 2003-06. From the cropping pattern changes of these crops, it can also be said that the growth of rice is slowed down and other crops like oilseeds and potatoes are emerging after 1993-96 which means that the agriculture in North-West is diversifying towards horticulture and cash crops.

The growth of area, production and productivity of various horticulture crops in North-West Himalayan states during 2006 to 2010 has been increasing from year to year. It is due to the reason that mountain farmers diversified towards horticulture and cash crops after liberalization. Himachal Pradesh has witnessed a phenomenal increase in fruit production over last two decades. The average annual growth rates in the area, production and productivity of various fruits and vegetables between 2006 and 2010 shows positive growth rate.It is due to availability of irrigation facility and also because of high returns from these crops in the domestic and international market.

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