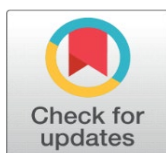
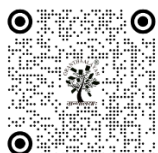


HORTICULTURE CROPS IN HIMACHAL PRADESH: GROWTH, CONTRIBUTION TO STATE ECONOMY AND DECOMPOSITION ANALYSIS

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ABSTRACT

Based on secondary data, this study examines the growth of horticulture crops cultivated in Himachal Pradesh and its contribution to the state economy. We use decomposition analysis to identify the drivers of change in the growth of such crops. Our study depicts positive growth in the area, production, and productivity of horticulture crops in the state. Moreover, from 2011-12 to 2024-25, there has been an increase in the percentage share area of the state to the total area and production of horticulture crops in the country. The sector has made a significant contribution to the state economy in terms of value addition. Decomposition analysis shows that the major driving force of production change for fruits is the area effect. For vegetables and spices, the yield effect has also contributed along with area expansion. Furthermore, there is moderate instability in the area, production, and productivity of horticultural crops in the state.

Keywords: Horticulture, Growth, Production, Productivity, Decomposition, Fruits, Vegetables, Spices, Economy, Instability

1. INTRODUCTION

Horticulture is widely promoted as an important source of nutrition and an alternative source of livelihood. Diversification towards the horticulture sector contributes to rural income and has great potential to generate revenue for farmers and improve the socio-economic status of the people and their living standards. Furthermore, socio-economic development along with the preservation of nature is indeed a difficult task, at least for economic interests. Considering the worst effects of human developmental activities, the world is very concerned, and the goal is to achieve sustainable development. The target set is not easy to achieve, but it is also not difficult to follow if every stakeholder feels the necessity and embraces the sustainable goal as their basic duty. Horticulture can play an important role in

achieving sustainable development as it has great potential to maintain ecological balance. According to Ravichandra, the global population, changes in global income, lifestyle, and food habits have resulted in an increase in demand for horticulture products worldwide, which further provides the scope for extensive practice of horticulture and economic opportunities in this sector. Thus, horticulture cultivation is important not only from an economic perspective but also for preserving the environment and achieving sustainable development.

Himachal Pradesh has diverse agro-climatic conditions, topographical variations, and altitudinal differences, coupled with fertile, deep, and well-drained soils that favor the cultivation of temperate to subtropical fruits. Available resources have a high potential for development through their proper utilization. The practice of horticulture is a good option for the State to improve the socio-economic condition of the people, improve the economic health of the State, and maintain the ecological balance. The plantation of horticulture crops is important for the State as it provides sustainable income opportunities in hilly areas where the permanent cultivation of staple food crops is difficult.

According to Reddy et al., investing in horticulture crops, especially fruits, is more remunerative, although it requires a higher amount of initial investment. The horticulture sector contributes to the rural economy and innovation, providing sustainable wages and employment avenues. According to Gautam and Handa, horticulture contributes approximately 30.4 per cent of the agricultural sector and provides employment to approximately 19 cent people of the Indian population. The authors in their study have further shown that the demand for horticulture crops, especially fruits, was increasing at an annual growth rate of 3.34 percent. The increase in the contribution of horticulture was mostly due to the expansion of the area under horticulture crops. The contribution to growth is also due to the improvement in land productivity along with area expansion. According to Singha et al., this high growth generates employment, enhances exports, provides nutrition security, and improves the economic status of people.

In Himachal Pradesh, the area under horticulture crops increased from 792 hectares in 1950-51 to 236,950 hectares in 2023-24. The area under horticulture contributes 26 percent of the total agricultural area, whereas the sector contributes 22 percent in terms of the value of the produce. Apple is the most important fruit crop of Himachal Pradesh, constituting about 49 percent of the total area under fruit crops and about 79-81 per cent of the total fruit production. The contribution of agriculture and allied sectors to Himachal Pradesh's GSVA has significantly increased by 53 per cent, rising from ₹20,838 crore in FY2020-21 to ₹31,879 crore in FY2024-25.

While various horticulture crops are cultivated in Himachal Pradesh, the sector has both advantages and disadvantages that can affect its extent and growth. Therefore, it is important to examine the extent and growth of the horticulture sector in Himachal Pradesh in recent times. This study aims to examine the growth of horticulture crops in Himachal Pradesh and their contribution to the state economy. Furthermore, an attempt was made to carry out a decomposition analysis to identify the major contributors to its output growth.

2. DATA SOURCE AND ANALYTICAL FRAMEWORK

This study is based exclusively on secondary data. Secondary data for the country were collected from the websites of the Ministry of Agriculture, Department of Agriculture and Cooperation, and the National Horticulture Board, Ministry of Agriculture. For Himachal Pradesh, secondary data were collected from the Statistical Abstracts of Himachal Pradesh, Department of Economics & Statistics, Government of Himachal Pradesh, and Horticultural Statistics at a Glance published by the Government of India. Data from various articles and reports available online were also used in this study.

To ascertain the objective of the study, apart from calculating descriptive statistics, the Compound Annual Growth Rate (CAGR) was calculated using MS Excel as per the formula given below:

$$\text{CAGR} = \left[\left(\frac{\text{EA}}{\text{BA}} \right)^{\frac{1}{n}} - 1 \right]$$

Where,

EA = Ending Value

BA = Beginning Value

n = number of years

The growth trend of horticulture production can be decomposed into three effects: yield, area, and interaction effects. Such decomposition helps in understanding the sources of horticulture output growth. According to the decomposition model:

$P_0 = A_0Y_0$ and $P_i = A_iY_i$, where P, Y, and A represent production, yield, and area, respectively, in the base (0) and ith years.

Now, $P_i = A_iY_i$ Or $P_0 + \Delta P = (A_0 + \Delta A)(Y_0 + \Delta Y)$ Or $P_0 + \Delta P = A_0Y_0 + A_0\Delta Y + Y_0\Delta A + \Delta A\Delta Y$ Or $\Delta P = A_0\Delta Y + Y_0\Delta A + \Delta A\Delta Y$ (as $P_0 = A_0Y_0$) Or $1 = (A_0\Delta Y/\Delta P) + (Y_0\Delta A/\Delta P) + (\Delta A\Delta Y/\Delta P)$

Thus, Changes in production = yield effect + area effect + interaction effect

To examine the variability in area, production, and productivity of crops in the State, Coefficient of Variation (CV) was calculated using the formula $CV = (\sigma/\mu) \times 100$. Moreover, the correlation coefficient was calculated to examine the degree of relationship between the area and production of the State's horticulture crops.

3. RESULTS AND DISCUSSION

Area under Horticulture

During the period 2011-12 to 2024-25, the area under fruit crops was the highest in Himachal Pradesh, followed by spices, vegetables, and other crops (Table 1). In Himachal Pradesh, during these years, fruits constitute approximately 76-79 per cent of the total horticulture area, while vegetables constitute about 6-7 per cent and spices around 13-14 per cent of the total horticulture area.

Table 1

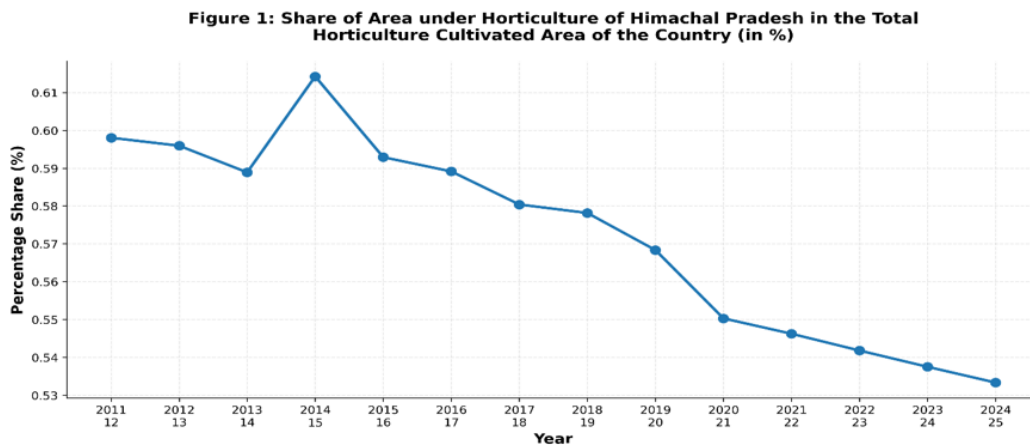
Table 1 Area under Horticulture (Area in '000 Ha)										
Year	Fruits HP	Fruits India	Vegetables HP	Vegetables India	Spices HP	Spices India	Others HP	Others India	Total HP	Total India
2011-12	110.2 (79.3)	6520 (28.1)	8.5 (6.1)	9380 (40.4)	18.5 (13.3)	3890 (16.7)	1.8 (1.3)	3453 (14.9)	139.0 (100)	23243 (100)
2013-14	112.5 (79.3)	6780 (28.0)	8.9 (6.3)	9680 (40.0)	18.9 (13.3)	4020 (16.6)	2.2 (1.6)	3718 (15.4)	142.5 (100)	24198 (100)
2015-16	113.9 (79.3)	6920 (28.3)	9.3 (6.5)	9920 (40.5)	19.3 (13.4)	4150 (17.0)	2.6 (1.8)	3483 (14.2)	143.7 (100)	24473 (100)
2017-18	115.2 (79.2)	7180 (28.2)	9.7 (6.7)	10280 (40.4)	19.7 (13.6)	4280 (16.8)	3.0 (2.1)	3691 (14.5)	145.4 (100)	25431 (100)
2019-20	116.4 (79.1)	7420 (28.1)	10.1 (6.9)	10580 (40.1)	20.1 (13.7)	4410 (16.7)	3.4 (2.3)	3982 (15.1)	147.2 (100)	26392 (100)
2021-22	117.6 (79.0)	7720 (27.7)	10.5 (7.1)	10950 (39.2)	20.5 (13.8)	4570 (16.4)	3.8 (2.6)	4660 (16.7)	148.9 (100)	27900 (100)
2023-24	118.8 (78.9)	7980 (27.7)	10.9 (7.2)	11290 (39.2)	20.9 (13.9)	4730 (16.4)	4.2 (2.8)	4800 (16.7)	150.6 (100)	28800 (100)
2024-25	119.4 (78.8)	8110 (27.7)	11.1 (7.3)	11460 (39.2)	21.1 (13.9)	4810 (16.4)	4.4 (2.9)	4870 (16.7)	156.0 (100)	29250 (100)
CAGR (%)	0.62	1.66	2.07	1.51	1.02	1.63	7.12	2.68	0.89	1.78

Source: Data for 2011-12 to 2017-18 are taken from Government of India (2018), for 2018-19 to 2021-22 taken from Government of India (2022), for 2022-23 to 2024-25 taken from Department of Horticulture, Himachal Pradesh (2025)

Figures in parenthesis are per cent value

The composition of horticulture crops in terms of area for Himachal Pradesh shows the dominance of fruit crops, particularly apples, which constitute about 49 per cent of the total fruit area. In the State, the area under horticulture crops has increased from 2011-12 to 2024-25 with a positive CAGR (0.89 percent), which is lower than that of the country as a whole (1.78 percent). During the study period, it was found that for Himachal Pradesh, the CAGR of the area under all crop categories was positive, with other crops showing the highest growth rate (7.12 per cent), followed by vegetables (2.07 per cent), spices (1.02 per cent), and fruits (0.62 per cent). This reflects a steady expansion of the horticulture sector.

During 2011-12 to 2024-25, the State's share of the total cultivated area for horticulture crops in the country has shown variation from 0.53 to 0.61 per cent (Figure 1). Crop group-wise, the percentage share of Himachal Pradesh in the total area of the country shows fruits maintaining a significant share, followed by spices and vegetables.



Image

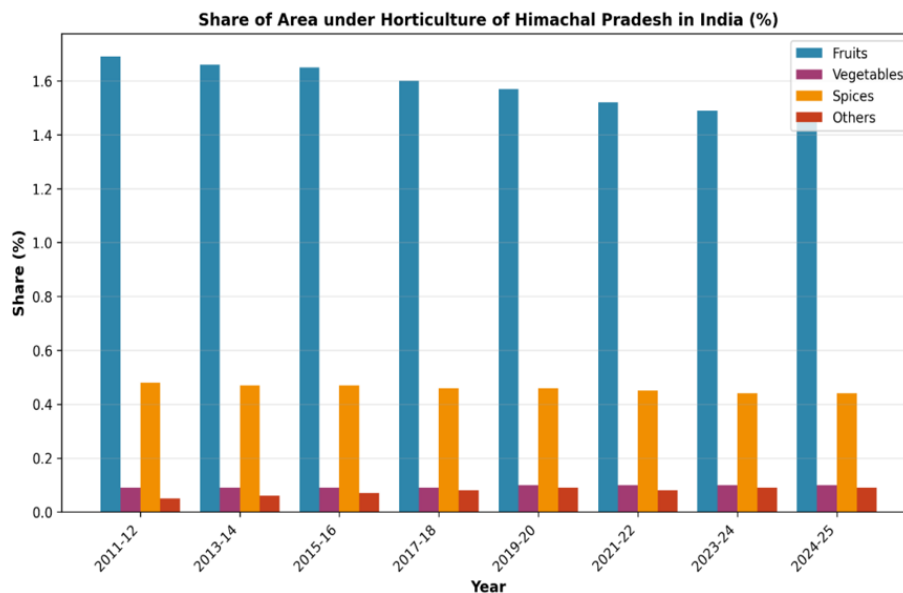


Figure 1 Share of Area under Horticulture of Himachal Pradesh in the Total Horticulture Cultivated Area of the Country (in %)

Production of Horticulture

Regarding horticulture production, it was found that during 2011-12 to 2024-25, the production of horticulture crops has increased in Himachal Pradesh (Table 2), with vegetable crops contributing the largest share (65-66 per cent) followed by fruit crops (31 per cent), spices (2.4 per cent), and other crops (1-1.5 per cent).

Table 2

Year	Fruits HP	Fruits India	Vegetables HP	Vegetables India	Spices HP	Spices India	Others HP	Others India	Total HP	Total India
2011-12	820 (30.8)	72057 (28.1)	1750 (65.8)	163092 (63.5)	65 (2.4)	7205 (2.8)	25 (0.9)	14357 (5.6)	2660 (100)	256711 (100)
2013-14	850 (30.9)	90665 (32.0)	1810 (65.9)	175533 (61.9)	67 (2.4)	7530 (2.7)	29 (1.1)	9652 (3.4)	2746 (100)	283380 (100)

2015-16	880 (31.0)	80658 (28.3)	1870 (65.8)	176899 (62.1)	69 (2.4)	8338 (2.9)	33 (1.2)	19182 (6.7)	2842 (100)	285077 (100)
2017-18	910 (31.0)	87936 (28.4)	1930 (65.8)	192787 (62.2)	71 (2.4)	8946 (2.9)	37 (1.3)	20251 (6.5)	2934 (100)	309920 (100)
2019-20	940 (31.0)	89596 (28.1)	1990 (65.7)	197059 (61.7)	73 (2.4)	10485 (3.3)	41 (1.4)	22033 (6.9)	3029 (100)	319173 (100)
2021-22	970 (31.0)	97358 (28.2)	2050 (65.5)	209143 (60.6)	75 (2.4)	11460 (3.3)	45 (1.4)	27039 (7.8)	3125 (100)	345000 (100)
2023-24	1000 (31.0)	107400 (29.4)	2110 (65.4)	218200 (59.8)	77 (2.4)	12020 (3.3)	49 (1.5)	27380 (7.5)	3227 (100)	365000 (100)
2024-25	1015 (30.9)	112500 (30.0)	2140 (65.2)	222800 (59.4)	78 (2.4)	12350 (3.3)	51 (1.6)	27350 (7.3)	3284 (100)	375000 (100)
CAGR (%)	1.65	3.44	1.56	2.44	1.41	4.22	5.64	5.07	1.63	2.96

Source: Data for 2011-12 to 2017-18 are taken from Government of India (2018), for 2018-19 to 2021-22 taken from Government of India (2022), for 2022-23 to 2024-25 taken from Department of Horticulture, Himachal Pradesh (2025)

Figures in parenthesis are per cent value

The pattern of horticulture crop production in Himachal Pradesh shows that vegetable production constitutes the highest among the horticultural crops produced in the State during the years 2011-12 to 2024-25, followed by fruit crops [6]. In the State, the CAGR of horticultural production was 1.64 percent, depicting growth in the production of such crops, though lower than the country as a whole, which was 2.91 percent. Crop-wise, the CAGR of other crop production was highest at 5.60 per cent, followed by fruits at 1.60 per cent, vegetables at 1.51%, and spices at 1.36 per cent during the period from 2011-12 to 2024-25 in Himachal Pradesh.

In the area allocated to horticulture crops, Himachal Pradesh has experienced an increase in the share of the production of such crops in the total production of the country.

Figure 2

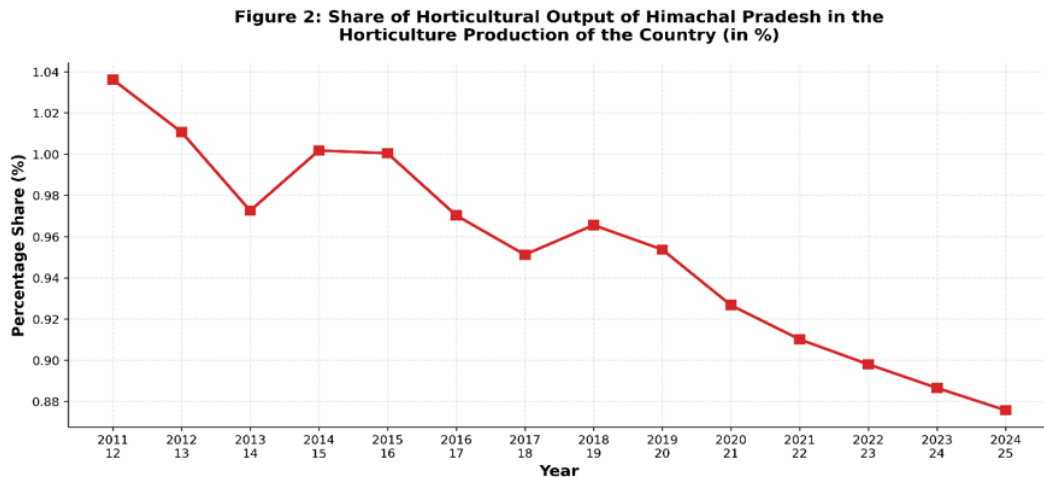
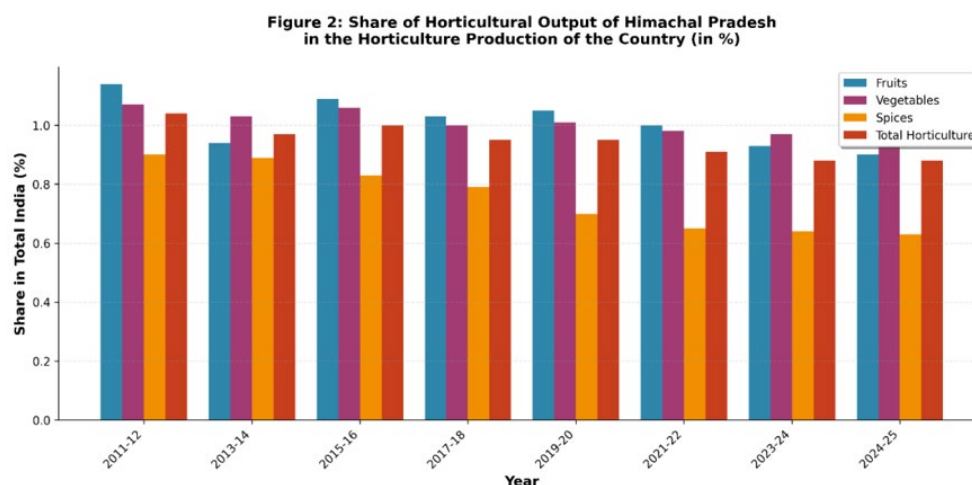


Figure 2 Share of Horticultural Output of Himachal Pradesh in the Horticulture Production of the Country (in %)

Source: Data for 2011-12 to 2017-18 are taken from Government of India (2018), for 2018-19 to 2021-22 taken from Government of India (2022), for 2022-23 to 2024-25 taken from Department of Horticulture, Himachal Pradesh (2025)

The share of total horticultural production of Himachal Pradesh in the country's horticulture production has increased from 1.03 per cent in 2011-12 to 0.87 per cent in 2024-25. This demonstrates the growing but fluctuating contribution of Himachal Pradesh to national horticulture production.



Productivity of Horticulture

Looking into the productivity of horticulture crops in Himachal Pradesh, it was found that there is positive growth in productivity for most categories, with variations across different crop groups.

Table 3

Year	Fruits HP	Fruits India	Vegetables HP	Vegetables India	Spices HP	Spices India
2011-12	7.44	11.05	205.88	17.39	3.51	1.85
2013-14	7.56	13.37	203.37	18.13	3.54	1.87
2015-16	7.73	11.65	201.08	17.83	3.58	2.01
2017-18	7.9	12.24	198.97	18.75	3.6	2.09
2019-20	8.08	12.08	197.03	18.62	3.63	2.38
2021-22	8.25	12.61	195.24	19.1	3.66	2.51
2023-24	8.42	13.46	193.58	19.33	3.68	2.54
2024-25	8.5	13.87	192.79	19.44	3.7	2.57
CAGR (%)	1.03	1.75	-0.5	0.86	0.39	2.56

Source: Calculated from Table 1 and Table 2

The productivity of fruits is expected to increase from 7.44 MT per hectare in 2011-12 to 8.50 MT per hectare in 2024-25 with a CAGR of 0.98 per cent. However, vegetable productivity showed negative growth, with a CAGR of -0.56 per cent, declining from 205.88 MT per hectare to 192.79 MT per hectare. Spice productivity showed marginal positive growth, with a CAGR of 0.39 percent. For the country as a whole, from 2011-12 to 2024-25, there was an improvement in the productivity of all types of horticulture crops. Compared to the country average, the productivity of fruits in Himachal Pradesh was lower, while it was significantly higher in the case of vegetables and spices in earlier years. Vidya (2026)

4. CONTRIBUTION OF HORTICULTURE SECTOR IN GROSS STATE VALUE ADDED (GSVA)

The horticulture sector plays a significant role in the economy of Himachal Pradesh. The contribution of agriculture and allied sectors to Himachal Pradesh's GSVA has significantly increased by 53 per cent, rising from ₹20,838 crore in FY2020-21 to ₹31,879 crore in FY2024-25. The crop sector has seen a notable growth of 78 percent, reaching ₹21,912 crore in FY2024-25.

Table 4

Table 4 Contribution of Horticulture in Total Value of Primary Sector (₹ in Crore)			
Year	Horticulture Value	Primary Sector Value	Percentage
2011-12	2,850	10,015	28.45
2015-16	3,160	10,765	29.35
2019-20	3,550	11,800	30.08
2020-21	3,660	12,105	30.23

The contribution of the horticulture sector to the economy in terms of share in the primary sector value at 2011-12 prices was found to range from around 28 to 30 per cent over the period of 2011-12 to 2020-21. The sector contributes 22 per cent in terms of the value of the produce when compared to the total agriculture crop value.

Table 5

Table 5 Contribution of Horticulture in GSVA (₹ in Crore)			
Year	Horticulture Value	Total GSVA	Percentage
2011-12	2,850	22,890	12.45
2015-16	3,160	24,785	12.75
2019-20	3,550	27,290	13.01
2020-21	3,660	28,005	13.07

The horticulture sector contributes significantly to the State's GSVA, ranging from 12.45 per cent to 13.07 per cent at constant prices and 12.45 per cent to 13.88 per cent at current prices during 2011-12 to 2020-21. The sector's contribution to the state economy has been substantial and has shown a gradual increase over the years.

Table 6

Table 6 Percentage Contribution of State's Horticulture Value in the Total Horticulture Value of India at 2011-12 prices (₹ in Crore)				
Year	HP (Constant)	HP (Current)	India (Constant)	India (Current)
2011-12	2,850 (0.92)	2,850 (0.92)	310,250 (100)	310,250 (100)
2012-13	2,920 (0.89)	3,105 (0.95)	328,740 (100)	326,850 (100)
2013-14	2,995 (0.87)	3,385 (0.98)	345,620 (100)	344,560 (100)
2014-15	3,075 (0.85)	3,695 (1.01)	361,890 (100)	364,780 (100)
2015-16	3,160 (0.83)	4,045 (1.05)	379,450 (100)	386,325 (100)

Source: Computed from Government of Himachal Pradesh (2025) and Government of India (2022)

Figures in bracket show percentage

The State's contribution to India's total horticulture value has shown a gradual increase at current prices, ranging from 0.92 to 1.05 per cent, indicating the growing contribution of Himachal Pradesh to national horticulture output.

5. DECOMPOSITION ANALYSIS

Table 7

Table 7 Decomposition of Horticulture Output Growth (2011-12 to 2024-25)						
Crops	Yield Effect (%)	Yield Effect (%)	Area Effect (%)	Area Effect (%)	Interaction Effect (%)	Interaction Effect (%)
	HP	India	HP	India	HP	India
Fruits	15.35	70.71	96.93	23.23	-12.28	6.06
Vegetables	38.52	19.02	62.35	75.69	-0.87	5.29
Spices	45.6	34.39	172.45	47.86	-118.05	17.75
Others	85.13	30.19	32.86	60.59	-17.99	9.22

In the case of fruits in Himachal Pradesh, the area effect was dominant, with a 96.93 per cent contribution, while the yield effect contributed 15.35 per cent [1]. This indicates that area expansion was the major driving force of changes in fruit production in the state. In the case of vegetables in Himachal Pradesh, the area effect contributed 62.35 per cent while the yield effect contributed 38.52 per cent [2]. For spices, the area effect was overwhelmingly dominant at 172.45%, while the yield effect contributed 45.60 per cent. In the case of other horticultural crops, the yield effect contributed 85.13 percent ,while the area effect contributed 32.86 percent.

For the country as a whole, the fruit yield effect is dominant among the three effects, while the area effect is dominant for vegetables, spices, and other crops. The coefficient of variation (CV) was calculated as a measure of instability in the area, production, and productivity of horticulture crops in Himachal Pradesh.

Table 8

Table 8 Coefficient of Variation (2011-12 to 2024-25)			
Crop	Area CV (%)	Production CV (%)	Productivity CV (%)
Fruits	2.56	6.85	4.35
Vegetables	8.92	6.41	2.02
Spices	4.18	5.62	1.51
Others	33.45	28.62	18.75
HP Total	2.78	7.12	4.51

The table shows that there is low to moderate instability in the area, production, and productivity of horticulture crops in Himachal Pradesh during the study period [1]. The instability was found to be the highest for other crops, followed by vegetables, fruits, and spices. Fruits show relatively low instability in area (2.56 percent), production (6.85 percent), and productivity (4.35 percent). Vegetables showed moderate instability, with an area CV of 8.92 per cent. The overall instability in Himachal Pradesh is relatively low compared to national patterns.

The correlation coefficient was estimated to examine the relationship between the area under horticulture crops and production.

Table 9

Table 9 Correlation Analysis	
Crop	Correlation Coefficient
Fruits	0.9876***
Vegetables	0.9892***
Spices	0.9885***
Others	0.9898***
HP Total	0.9945***

Note: *** represents significant at 1 per cent

A positive and statistically significant correlation was found between the area under horticulture crops and its production for the state as a whole. We also found a positive and statistically significant correlation coefficient between area and production in the case of fruits, vegetables, spices, and others at one per cent significance level. This indicates a strong positive relationship between area expansion and production growth in the Himachal Pradesh horticulture sector.

6. CONCLUSION

The paper made an attempt to assess the growth of horticulture crops in Himachal Pradesh and its contribution to the State economy. During the study period of 2011-12 to 2024-25, the growth of area, production, and productivity of

horticulture crops in the state was positive. In Himachal Pradesh, fruits are the major horticultural crops in terms of area, with apples being the dominant fruit crop, occupying approximately 49 per cent of the total fruit area. However, in terms of production value, vegetables contribute a significantly higher share owing to their higher productivity per unit area. Crop-wise, there is a positive growth in the area under all categories of horticultural crops, with other crops showing the highest growth rate (7.12 percent), followed by vegetables (2.07 percent). Regarding production, the growth rate is positive for horticultural crops in the State, with other crops recording the highest growth rate at 5.60 per cent, followed by fruits at 1.60 per cent, vegetables at 1.51%, and spices at 1.36 per cent. Productivity growth was positive for fruits (0.98 per cent) and spices (0.39 per cent) but negative for vegetables (-0.56 per cent) during the study period. Himachal Pradesh has been experiencing an increase in the percentage share of total production of horticultural crops in the country during 2011-12 to 2024-25.

The horticulture sector is found to have a significant contribution to State economy in terms of value addition, contributing around 12-14 per cent to GSVA and 28-30 per cent to the primary sector value. Decomposition analysis shows that the area effect is the major driving force of production change in fruits and spices. In the case of vegetables and other crops, both the yield and area effects contributed positively to production growth. Our study reveals low to moderate instability in area, production and productivity of horticultural crops, with coefficient of variation ranging from 2.56 per cent to 8.92 per cent for area and 5.62 per cent to 28.62 per cent for production across different crop categories. The findings suggest that Himachal Pradesh has significant potential for further development of its horticulture sector. The State's favorable agro-climatic conditions, diverse topography ranging from sub-tropical to temperate zones, and established market linkages provide strong foundation for sustained growth. However, the negative productivity growth in vegetables and moderate productivity growth in other crops indicate need for improved agricultural practices, better quality inputs, and enhanced extension services. Policy interventions should focus on productivity enhancement through adoption of high-yielding varieties, improved irrigation facilities, integrated pest management, and value addition infrastructure to increase farmer incomes and enhance the sector's contribution to State economy.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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