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Manuscript ID:
IJWGAFES-2026-030706

DOI: 10.5281/zenodo.24576817

DOI Link:
https://doi.org/10.5281/zenodo.24576817

Volume: 3
Issue: 7
July
Year: 2026
E-ISSN: 3066-1552

Submitted: *07 June 2026*
Revised: *12 June 2026*
Accepted: *12 July 2026*
Published: *31 July 2026*

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How to cite this article:
Monika, Khan, M. H., & Chand, J. (2026). Spatial Analysis of Horticultural Land Use Patterns in Shimla District, Himachal Pradesh District, Himachal Pradesh. International Journal of World Geology, Geography, Agriculture, Forestry and Environment Sciences, 3(7), 30–34. https://doi.org/10.5281/zenodo.24576817

Spatial Analysis of Horticultural Land Use Patterns in Shimla District, Himachal Pradesh

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Abstract:

Apple cultivation has played a major role in changing the agricultural and socio-economic conditions of Shimla district, Himachal Pradesh. The commercial development of apple farming, initiated through the efforts of Late Shri Satyanand Stokes in Kotgarh, gradually expanded to other parts of the district because of its higher profitability than traditional farming. It has increased rural incomes, improved household livelihoods and food security, and strengthened the economic well-being of farming communities.The growth of apple horticulture has also encouraged investment in education, improved living standards, and enhanced the social and economic status of women. In addition, it has created employment and promoted allied activities such as fruit marketing, transportation, packaging, and the supply of agricultural inputs. Thus, apple cultivation has become an important source of rural transformation and development in Shimla district, contributing to economic growth, employment generation, social progress, and agricultural modernization.

Keywords: *Apple cultivation, Horticulture, Socio-economic development, Rural transformation, Employment, Livelihood.*

Introduction

Apple cultivation has brought a remarkable change in the traditional agricultural practices of Shimla district. It has made a major contribution to the economic development and modernization of rural areas, where a significant share of the district's population lives. The growth of apple farming in Shimla is largely linked with the efforts of Late Shri Satyanand Stokes, a missionary who introduced apple planting material from America and cultivated it in the Kotgarh region. Kotgarh became the centre of the first large-scale commercial apple plantation in the area. Following its success, apple cultivation gradually expanded to nearby regions and eventually reached Kiari village in Kotkhai during the 1930s. The high economic returns from apple cultivation motivated farmers from other areas of the district to take up this activity. Gradually, large areas of Shimla were converted into one of the major apple-producing regions of Himachal Pradesh. In contrast to traditional agriculture, which was primarily focused on subsistence production, apple farming provided significantly greater income from the same unit of land. As a result, the economic status of farming households improved, along with their ability to meet their food requirements and maintain food security. The growing income generated through apple production enabled many farming families to achieve greater economic stability, while some villages in Shimla district have been reported to have remarkably high per-capita incomes. Consequently, apple-based horticulture has emerged as a significant part of the regional economy. It has played an important role in improving the socio-economic conditions of farming communities and has, in turn, contributed to the overall economic development of Himachal Pradesh.

The present research focuses on the socio-economic transformations associated with the expansion of apple cultivation in Shimla district. To understand the nature and magnitude of development in the region, a range of socio-economic indicators was examined across selected villages. The increasing adoption of apple cultivation has brought about significant changes in the social conditions of rural households. Higher incomes generated from apple farming have enabled families to allocate greater resources towards education and offer improved educational facilities to their children.

With rising economic prosperity and greater emphasis on education, many orchard-owning families increasingly opted to educate their children in convent schools. Consequently, educational achievement has gradually emerged as an important measure of social standing among the younger generation of apple-growing households. The growing preference for convent education in rural settlements also contributed to the movement of financially prosperous orchard owners towards small towns and major urban centres within the state. Alongside this trend, professional and specialized education including MBBS, BAMS, hotel management, MBA, and advanced programmes in horticulture and agriculture has gained increasing importance within the social structure of these communities (Randev, 2003). The growth of apple cultivation has played a significant role in enhancing the socio-economic status of women in the region. Over time, women have moved away from strenuous and labour-intensive agricultural activities and have become more actively involved in orchard operations and the management of household affairs.

Educated women have contributed substantially to improving the quality of family life through the adoption of modern kitchen appliances, improved household amenities, and better living arrangements. The expansion of female education has been particularly noteworthy and can be regarded as a major indicator of social progress in the region. The rising level of education and improved social position of women may also be linked to the economic opportunities and increased household prosperity generated by apple cultivation (Thakur and Tiwari, 1998). The expansion of apple cultivation has created numerous avenues for both direct and indirect employment in the region. The younger generation of rural households has increasingly become involved in the emerging economic activities associated with apple-based horticulture. At the same time, the traditional system of absentee landownership has gradually declined as landowners have become more actively engaged in agricultural and orchard-related activities. Apart from generating employment within orchards, apple cultivation has encouraged various forms of self-employment and the growth of ancillary businesses. These activities include the production of cartons and packing trays, manufacturing of binding straps and clips, transportation services, horticultural labour, commission-based marketing of fruits, wholesale and retail fruit trade, as well as businesses associated with pesticides and fertilizers. Thus, the growth of apple cultivation has contributed not only to higher agricultural earnings but also to the diversification of livelihood opportunities, thereby playing an important role in the broader socio-economic transformation of rural communities in Shimla district (Thakur, 2003).

Table 1.1

Land Use in Horticulture in District Shimla of Himachal Pradesh From 1990-91, 1999-2000, 2002-03 to 2022-23 (in Hac.)

Sr. No.	**Name of Fruit**	**1990-91**	**1999-2000**	**2002-03**	**2022-23**
1.	**Apple**	25191(82.66)	34420 (84.56)	37307 (84.43)	42291 (85.64)
2.	**Nuts and Dry Fruits**	1496 (4.90)	1990 (4.89)	2078 (4.83)	1776 (3.60)
3.	**Citrus Fruits**	732 (2.40)	771 (1.90)	823 (1.91)	630 (1.28)
4.	**Other Sub Tropical Fruits**	3057 (10.03)	3524 (8.65)	3796 (8.82)	4684 (9.48)
Total		**30476 (100)**	**40705 (100)**	**43004 (100)**	**49381 (100)**

Source: Directorate of Horticulture Shimla, H.P.

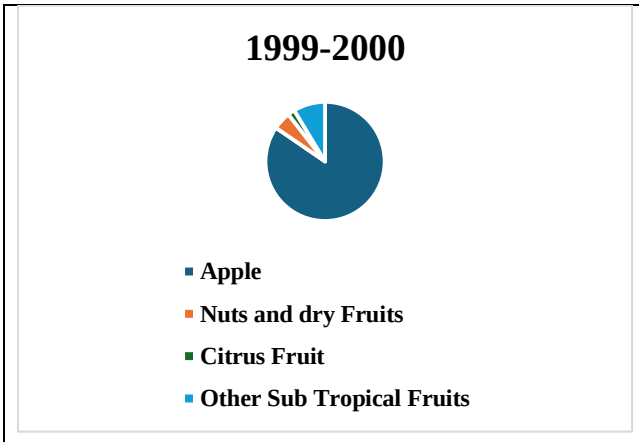

Fig 1.1

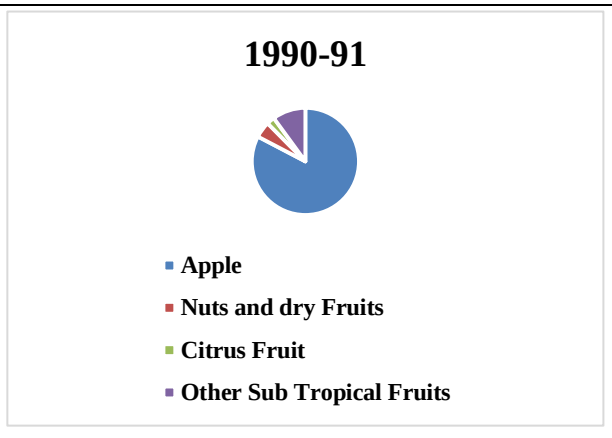

Fig 1.2

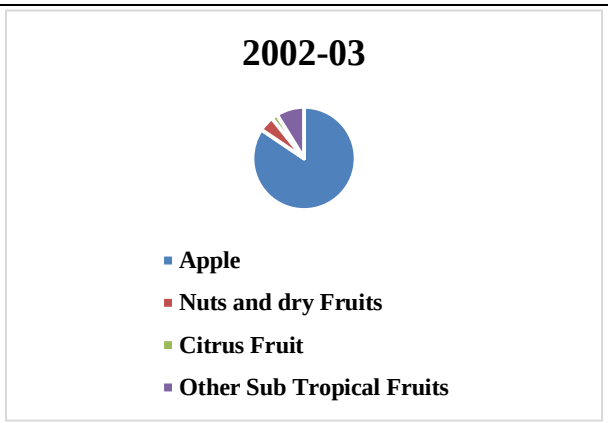

Fig 1.3

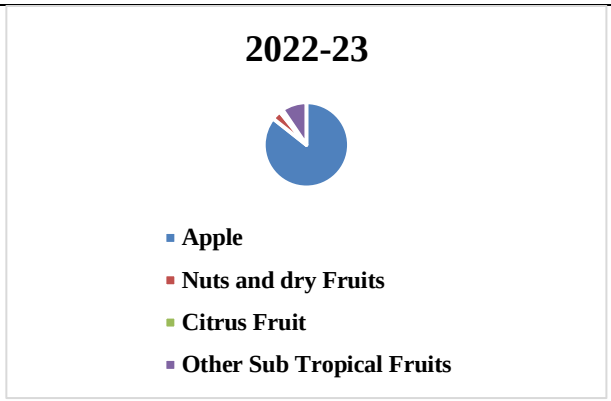

Fig 1.4

Table 1.1 presents the changes in the area devoted to various horticultural fruit crops in Shimla district for the years 1990-91, 1999-2000, 2002-03 and 2022-23. The figures **(1.1 to 1.4)** indicate a marked expansion of horticultural activities across the district over the study period. The overall area under horticultural crops rose substantially from approximately 30,878 hectares in 1990-91 to 49,381 hectares in 2022-23, reflecting a significant increase in the land brought under fruit cultivation. Among the different fruit crops, apple remained the dominant horticultural crop, accounting for the largest proportion of the total cultivated area. The area under apple orchards increased from 25,191 hectares to 42,291 hectares during the period under consideration. This considerable expansion may be associated with the relatively high profitability of apple production, favourable returns and market prices, increasing consumer demand, the introduction of improved varieties, and the adoption of modern orchard-management techniques. The greater economic benefits obtained from apple cultivation have encouraged farmers to move progressively from traditional agricultural practices towards commercially oriented horticulture. Nut and dry-fruit crops, particularly walnut, almond and chilgoza, also exhibited changes in their cultivated area during the study period. On the other hand, citrus crops such as orange, lemon, kinnow and grape showed relatively variable patterns of change. Subtropical fruits, including mango, litchi, guava, pomegranate and papaya, registered an increase in cultivated area from 3,057 hectares to 4,684 hectares. This growth reflects an increasing tendency towards diversification within the horticultural sector of the district. Overall, the data indicate a gradual transformation of Shimla's horticultural landscape towards a more commercialised and diversified production system. This change has been facilitated by higher economic returns, technological advancements, the availability of improved fruit varieties, and expanding market opportunities. The growing importance of horticulture has consequently contributed to a significant transformation in the traditional pattern of agricultural land use in Shimla district.

Physical and Socio-Economic Factors Responsible for Apple Cultivation

The growth and productivity of apple orchards are greatly affected by both physical and socio-economic conditions. Major physical factors include the availability of suitable land, slope, proper drainage, soil quality, temperature, rainfall, and snowfall. Along with these natural conditions, socio-economic factors such as the availability of labour, financial support, banking facilities, and favourable social conditions also play an important role in the establishment and proper management of apple orchards.

Land/Relief

Suitable land is essential for successful apple cultivation. Apple trees can grow on both flat and sloping land, but gentle slopes suitable for terracing are generally preferred. The middle part of a slope is considered best because hilltops are more exposed to strong winds and often have drier, less fertile soil. The lower slopes may collect cold air and become frost-prone areas, which can damage apple trees. Very steep slopes make farming difficult and costly and can also cause the loss of fertilizers through leaching (Kanwar, 1987).

Drainage

Proper drainage is very important for healthy apple cultivation because apple trees **cannot tolerate waterlogging.** Excess water can reduce oxygen around the roots, weaken the plants, and may even cause tree death. Drainage channels should be inspected and cleaned regularly, particularly during the rainy season. In snowfall areas, drainage systems should also be maintained before winter. This is especially important in heavy soils, where melting snow in early spring can collect around the roots and negatively affect tree growth (Chadha, 2001).

Soil

Apple trees can grow in a variety of soils, but deep, fertile, and well-drained loamy soil is best for healthy growth and good-quality fruits. Very light soils may cause potassium and magnesium deficiencies, while calcareous soils can result in iron and manganese deficiencies. Therefore, proper soil selection is important for successful apple cultivation (Cummins and Aldwinckle, 1983).

Climatic Factors

Climate plays a major role in determining the success of apple cultivation and can sometimes be more important than soil conditions. Factors such as temperature, rainfall, snowfall, humidity, wind, sunlight, frost, and hail directly affect the growth and fruit production of apple trees. Since apple is a temperate fruit, it grows best in cool climatic conditions. During winter, trees need a sufficient period of low temperature for proper development. In tropical and subtropical areas, apples are mainly grown at higher altitudes where cooler conditions are available (Kanwar, 1987).

Temperature

Apple trees need a specific period of low temperature, known as the chilling period, for normal growth and proper development of fruit buds. If the required chilling is not received, flowering may become irregular and uneven. Chilling generally occurs at temperatures below 7°C. Most apple varieties require approximately 1,200 hours of chilling to complete their rest period and develop properly, although some varieties can perform satisfactorily with only about 250 hours. Kronenberg (1979) recommended approximately 1,000 hours at or below 7°C as a suitable chilling requirement. Therefore, areas where winter temperatures regularly fall below 7°C are generally more suitable for apple cultivation. However, excessively cold conditions and sudden fluctuations in winter temperature can also negatively affect apple production (Kanwar, 1987).

Socio-economic Factors

Socio-economic conditions play a major role in the development and success of apple farming. Important factors include labour availability, financial resources, banking services, and the social environment. Apple orchards require adequate skilled and affordable labour for activities such as planting, pruning, irrigation, spraying, harvesting, grading, packing, transportation, and general orchard maintenance. Sufficient capital is also necessary to purchase land, planting materials, fertilizers, machinery, plant-protection products, and other inputs. Banking and credit facilities help farmers meet the high costs involved in establishing and managing orchards. Moreover, a supportive social environment encourages farmers to adopt modern farming techniques and contributes to the growth and improvement of apple cultivation.

Conclusion:

Horticulture has emerged as one of the most significant drivers of agricultural and rural development in Shimla district of Himachal Pradesh. The shift from conventional agricultural practices towards commercial fruit cultivation has transformed the region's rural economy and created new opportunities for farming households. Apple production has become a major source of livelihood, providing farmers with better income opportunities and encouraging them to adopt modern agricultural practices. The expansion of horticultural activities has also stimulated the development of infrastructure, transportation, storage, marketing and other supporting services. Furthermore, improved household earnings have contributed to better educational opportunities, living conditions and greater participation of women in economic activities. Despite its contribution to regional development, horticulture remains an important component of the district's agricultural landscape. Overall, the growth of horticulture has brought considerable changes in the economic structure, occupational pattern and social conditions of rural communities, making it a key factor in the sustainable development of Shimla district.

Acknowledgement

I would like to express my sincere gratitude to all those who contributed directly or indirectly to the successful completion of this research study. I am particularly thankful to the Department of Horticulture, Government of Himachal Pradesh, and other relevant government agencies for making available valuable statistical information, reports, and secondary data related to horticultural development and land use patterns in Shimla District.

I extend my appreciation to researchers, academicians, and scholars whose published works provided valuable theoretical insights and methodological guidance for understanding the spatial distribution of horticultural activities. Their contributions helped strengthen the geographical and analytical framework of this study.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of thesis paper.

References

1. Chadha, T.R. (2001). *Text Book of Temperate Fruits*. ICAR, New Delhi.
2. Chanda, K. and Chandel, K. (2018). Challenges for horticulture industry in Himachal Pradesh: Vision 2030. *HGPI International Journal of Multidisciplinary Research and Development*, 1(1), 24-28.
3. Chand, J. (2025). Conservation of biodiversity and ecosystems in the Trans-Giri region, District Sirmaur, Himachal Pradesh. *InSight Bulletin: A Multidisciplinary Interlink International Research Journal*, 2(7), 155-157.
4. Chand, J. and Devi, P. (2024). Mapping the effects of deforestation on biodiversity in the Western Himalayas: A remote sensing and field survey study. *ANVESAK*, 54(1), 374-384.
5. Cummins, I.N. and Aldwinckle, H.S. (1983). In: *Plant Breeding Reviews*, pp. 294-394 (Janick, J., Ed.). A.V.I. Publishing Company Inc., Westport.
6. Devi, N. and Prasher, R.S. (2019). Growth pattern of horticultural crops in Himachal Pradesh. *Agricultural Research Journal*, 56(3), 547-555.
7. Kanwar, S.M. (1987). *Apples Production Technology and Economics*. Tata McGraw Hill Publishing Company Limited, New Delhi.
8. Kashyap, S., Kumar, A. and Thakur, H. (2022). Himachal: The role model of a horticulture state. *Just Agriculture*, 2, 12.
9. Kimothi, M.M., Kalubarme, M.H., Dutta, S., Thapa, R. and Sood, R.K. (1997). Remote sensing of horticultural plantations in Kumarsain Tehsil in Shimla district, Himachal Pradesh. *Journal of the Indian Society of Remote Sensing*, 25(1), 19-26.
10. Saakshi, D., Bhardwaj, D.R. and Bhatia, A.K. (2025). Land use and land cover analysis in agroforestry and other land use categories in Shimla district of Himachal Pradesh: A GIS-based analysis in North Western Himalayas. *Discover Forests*, 1, 33.
11. Sakiyama, R. (1991). What is horticulture? *Chronica Horticulture*, 17.
12. Swarup, R., Sikka, B.K. and Vaidya, C.S. (1987). Horticultural development in Himachal Pradesh: In retrospect and prospect. *Indian Journal of Agricultural Economics*, 42(3), 430-437.

13. Thakur, Lakshman Singh (2003). The apple farmers' concerns and expectations. In: Jindal, K.K., Bawa, R. and Partap, T. (Eds.), *Apple Farming and Livelihood in Himalayas: Trends, Concerns and Prospects*, pp. 333-337. Bishan Singh Mahinder Pal Singh, Dehradun, India.
14. Thakur, R.K. and Tiwari, S.C. (1998). *Work Participation and Drudgery of Hill Women - A Case Study in Himachal Pradesh*. Department of Social Sciences, UHF, Solan.
15. Verma, K.S., Mankotia, M.S., Verma, S. and Sharma, V.K. (2013). Impact of climate change on mountain horticulture. In: *Climate-Resilient Horticulture: Adaptation and Mitigation Strategies*, pp. 89-102. Springer India.