Apple Based Production and Socio-Economic Status of Rural Community

(A Study On Dhamwari village and Shiladesh village from chhuhara block District Shimla)

Dr. Meera Manjul( Assist.Prof.(faculty) Department of LifeLong Learning
Nishupal (Research Scholar Department of LifeLong Learning
Himachal Pradesh University SummerHill Shimla-171009

Abstract

The production and productivity is the important factor for our livelihood fulfilment. People most probably lives in rural areas, those who face so many socio-economic problems, due to lack of productivity or production. Rural people so much hard workers, they want to gain the different opportunities related productivity form their fields, like apple production some other seasonable cash crops etc. They produce so many things like handcrafting food making activities etc, for the maintenance of their sustainable economy as an entrepreneurship purpose. They tried to improve their selves for different types of production, they always ready to hard work to maintain their economy. The present study related to apple production and productivity in Himachal Pradesh during the period under this study to rising average under fruits has been the most striking feature of fruit growing in Himachal Pradesh. Shimla district was selected out of 12 districts for the study. Special focus on Dhamwari village and Shiladesh village from chhuhara block. The selection of these district as a study area was influenced by a few reasons. First, Shimla is highest apple producing district of the state. Second, apples from districts especially are known for their natural colour, sweetness, and succulence. Third, the districts have joint Agricultural Produce Market Committee “Shimla and Kinnaur”. And the last reason was that the both districts come under same division, i.e., Shimla division. During the last few decades, orchards have shown a reasonably wider spatial spread and a notable increase in production. The spatial spread of fruits however, varies markedly over the state. Apple covers 40 percent of the total area under fruits and constitutes nearly 60 percent of total production of fruits. It was first of all introduced at Kotgarh in district Shimla. This area formed the traditional node of its diffusion in the state. The fruit consolidated its position in this area and spread to surrounding areas where secondary nodes got established later. The proposed hypothesis in this regard therefore is proved. Apple presently is an outstanding cash crop of Himachal Pradesh with excellent quality apple being cultivated in the state. The state is often designated as "Apple State" which seems an appropriate epithet. Higher concentration of this commercial crop is associated with the cool temperate climate and considerable high altitudinal location of central parts of the state falling over Shimla, and kinnour districts. The development of infrastructural facilities such as transport, marketing in addition to the government and political support to the growers have significantly contributed to maintain the supremacy of apple in the apple-growing belt of Himachal Pradesh.
Introduction

Orchard farming during the past four and a half decades has impacted positively on the social and economic life of the people of the state. The coming of orchards has led to more income generation whereby improving the living conditions of the people especially those associated with orchards. Orchards also have a direct relationship with the ecology of the state. Thousands of acres of valuable lands that were being rendered useless annually because of the menace of soil erosion have been covered under orchards hence proper utilization of land has been made. Fruit plants also add to the vegetative cover and aesthetic beauty of the environment. They purify the air and decrease pollution.

The laborers are needed in the orchards round the year for carrying out various activities such as maturing, digging, pruning, spraying, packing, making boxes, loading in trucks to be sent to the market. Therefore, a large number of job opportunities exist for them. The waste lands, dry and semi-dry regions are better utilized if put under orchard crops. Raw material for several ancillary industries like preservation, extraction, packaging, transport, refrigeration and wine industries etc. is provided by orchards.

Orchard farming is an old art historically but as a commercial activity its origin is rather recent. Olive, apple, pomegranate, plum, pear, peach and apricot have been listed as the most ancient fruits in cultivation. Among the leading species of fruits grown vines, olives, citrus, apple etc. are important. About 30 million hectares of area is covered by fruits in the world. Apple, peach, pear, plum and apricot are known as the temperate fruits and are considered to be superior to any other fruit. Apple however, is the most important, in view of the fact that it brings maximum returns and covers largest hectare under fruits. Tropical's and sub-tropical include banana, mango, litchi, guava, jackfruit, orange and lemon. Besides these categories, nuts and dry fruits include almond, walnut, pecan-nut. It has been observed that every part of the globe be it a temperate, a tropical or a sub-tropical region grows various varieties of fruits.

The Indian history of the 13th century also mentions the existence of orchard farming that was highly on a subsistence scale. With the passage of time fruit growing has dispersed and become almost a business, oriented towards the market. This was infect, the first section of horticulture to become important. Annually, India earns more than half a billion dollars from fruits. The fruits have spread out over the entire country. They are dominantly prevalent in many states of India but an outstanding position in this regard is held by Himachal Pradesh. It is one of the mountainous states of the country which is flanked by the Indo-Genetic plains in the west and south; the Uttarakhand Himalayas and Tibetan plateau in the east and Jammu & Kashmir Himalayas in the North.
The State has experienced considerable diffusion of orchards (increase in orchard acreage) over the years. The orchards started developing on commercial lines around the middle of the 20th century. For chemical fertilizers and sprays, credit schemes provided by the government and social factors including education level, population characteristics have all been responsible for the uneven pattern of diffusion of orchards.

The opening of Progeny-cum-Demonstration Orchards/Nurseries, Fruit Research Station, Fruit Processing Units etc. have further been very helpful to the cultivators. All these have led to provision of disease free varieties of saplings, imparting of modern planting techniques, easy disposal of over ripe fruit crops. The ever increasing demand for these fruits in other states has also made the cultivation of these fruits more attractive. Development of roads and other infrastructural facilities has played a significant part in diffusion of orchards to newer areas. With the concerted efforts of the state government and the people, Himachal Pradesh has earned an eminent position on the horticulture map of India.

**Horticulture Sector in India and Himachal Pradesh**

Broadly, horticulture sector includes fruits, nuts, vegetables, flowers, medical plants, ornamental plants etc. and many additional related services. These may be for food, comfort or beauty. Horticulture is an important sub-sector in agriculture sector. In India, horticulture development was not a priority area until the post-1993 period, “when focused attention was given to horticulture development through an enhancement of plan allocation and knowledge-based technology” (Mittal, 2007).

Later, the establishment of “National Horticulture Mission” in the year 2005-06 by the Indian Government promoted this sector in a larger scale. The emphasis was on promoting agricultural exports in the Foreign Trade Policy 2004-09 and it was acknowledged that the promotion and growth of export of horticultural products was important for the country. India has witnessed the expansion of area under horticultural crops cultivation which is resulting in higher production over the last few years. This sector contributes about 30 percent share in total agriculture output.

Over the last decade, the area and production of horticultural crops have increased by 3 percent and 5.4 percent annually. The area under horticulture crops has increased to 24.47 million hectares in the year 2015-16 from 12.77 million hectares in the year 1991-92 and production has also increased to 286.19 million tone’s in the year 2015-16 from 95.56 million tones’ in the year 1991-92 (Horticultural Statistics at a Glance, 2017). The change in cropping pattern in India indicates the shift towards the cultivation of fruit crops and vegetable crops. In the present scenario, people are likely to increase their calories intake through the consumption of fruits and vegetables. “The consumption of fruits and vegetables is higher than the world population growth rate, which implies that the global per capita consumption of fruits and vegetables is on the rise” (Weerahewa et al., 2012). But the availability
of per capita fruits (which is around 200.6 grams per day) is very less to the recommended quantity of 230 grams per day (Horticultural Statistics at a Glance, 2017). After China with 13 percent of share, India is the second largest producer of fruits (except melons) in the world. Globally, India is leading producer in the production of fruits like Banana (24.5 percent), Mango, Mangosteen and Guava (40 percent), Lemon & lime (17.2 percent) and Papaya (44.4 percent) in the year 2014 (NHB, 2017). Other than these fruit crops, India has the fifth place in the production of pineapple and sixth in orange and tenth in apple. But in exports, India’s share in the global market is about 1 percent.

The country exported fruits worth Rs.4229.03 crores in the year 2017-18. Bananas, Mangos, Grapes, Walnuts and Pomegranate are the major fruits exported from the country. As per the available reports of Agricultural and Processed Food Products Export Development Authority (APEDA), “Major destinations of Indian fruits and vegetables are Bangladesh, UK, Saudi Arabia, Nepal, UAE, Malaysia, Singapore, and Saudi Arabia”.

In the production of total horticulture crops in India, fruit crops account the second highest share which is about 32 percent after vegetable crops (59 percent). In the year 2015-16, the production of fruit crops was 90.2 million metric tonnes under the area of 6.3 million. Andhra Pradesh is leading fruit producing state in India which accounts the share of around 13 percent in total fruit crop production, followed by Maharashtra (11 percent), Uttar Pradesh (11 percent), Gujarat (9 percent), Karnataka (8 percent), Tamil Nadu (7 percent) etc. (Horticultural Statistics at a Glance, 2017).

The temperate fruits are the monopoly crops in hilly regions, like Himachal Pradesh, Jammu & Kashmir, and Uttaranchal in India. Himachal Pradesh has been referred by the ancestors as „Dev Bhoomi (abode to the Gods)‟, which lies in the middle of the Himalayas in the northern part of India. According to professional surveys, its geographical area is 55.67 lakh hectare, most of which are under forest and pasture land. In the state, about 9.55 lakh hectares of operational holdings is operated by 9.61 lakh farmers. There is a preposition of small land holdings in the state. According to the Agricultural Census Report 2010-11, the total holdings of marginal farmers (less than one hectare) was 69.8 percent, while the area covered by these holdings was only 28.6 percent of the total area. When small farmers (1 to 2 hectares) are kept in mind with marginal farmers, then the percentage of the holdings comes to 88 percent whereas coverage of the area is only 54.2 percent.

The average size of holding is one hectare in the state. The main occupation of people of Himachal Pradesh is agriculture. About 69 percent of the main workers are engaged in agricultural work (Economic Survey, 2017-18). Horticultural crop production in the high and mid hills valley seems to be the schematic designed by nature. The suitable agro-climatic condition encourages farmers to cultivate cash crops like maize, rice, wheat, apple, mango, vegetable mushroom, hops etc. The contribution of the agriculture sector in total state gross domestic product of
the state has declined from 57.9 percent in the year 1950-51 to 9.7 percent in the year 2016-17. The economy has shown a shift toward industries and service sector, but still, the growth to state economy is determined by agriculture and horticulture sector. The production of fruit crops plays an important role by providing 900 lakh man-days employment and 3117.35 corers gross value to the state (State Horticulture Department, 2017).

The Government of Himachal Pradesh and the farmers have seized this opportunity and today the state has emerged as the „Horticultural State of India”.

**Apple Production in India and Himachal Pradesh**

Within the horticulture sector, apple is the one of the most important crops. Apple is one of the most popular and nutritious fresh fruits consumed globally. As per the available information, apple fruit farming started in Central Asia (Kazakhstan) million years ago and over time the cultivation spread to other parts of the world. The history of the apple cultivation in India goes back to the early twentieth century when in 1916, Samuel Even (Philadelphia) came to India and planted Golden Delicious variety of apple in Thanedar village of Himachal Pradesh. The cultivation of this variety became very popular and extended to the different areas of the state as well as in other states of India such as Jammu & Kashmir and Uttarakhand. China accounts the highest contribution in worldwide apple production followed by other countries such as USA, Poland, and India.

Source: Downloaded by author from Google map

India is the fourth largest apple producing country which contributes around 3 percent of the share in total apple production in the world. In India Jammu & Kashmir, Himachal Pradesh and Uttaranchal are the main apple producing states. The cultivation of apples also extended to other states like Arunachal Pradesh, TamilNadu, Nagaland, and Sikkim. India produced 2521 thousand million tons of apple crop under the area of 277 thousand
hectares in the year 2015-16. Among the all fruit crops produced in India, apple (2.8 percent) is the seventh highest producing fruit crop after Grapes and before Watermelon. Himachal Pradesh is the second largest apple producing state in India after Jammu & Kashmir and before Uttrakhand accounting 32 percent of the share in total apple production. Except for Una and Hamirpur districts, the other ten districts are indulged in the cultivation of apple crop. Shimla, Kullu, Mandi, Chamba, and Kinnaur are the major apple producing districts in Himachal Pradesh which together contributes around 99 percent of the share in total state apple production.

The study districts Shimla and Kinnaur together contributed around 75 percent share in apple production of the state in recent period. There are over 7500 apple varieties produced worldwide, in which most common and popular varieties are Red delicious, Golden delicious, Fuji, McIntoch, Gala, Lady, Cortland and Honey crisp etc. In India many varieties of apples are grown in which popularly Golden Delicious, Lal Ambri, Royal Delicious, Red June etc. are grown in Jammu & Kashmir and Royal Delicious, Rich-A-Red, Red Delicious, Golden Delicious etc. are grown in Himachal Pradesh.

Significance of the Study:

The main motivation to carry out the present study comes from the fact that many studies are not available on the present topic for Himachal Pradesh using the field survey data at the household level. Apple cultivation in Himachal Pradesh has several important significant implications on the apple farmers, social structure, climate issues and the overall economy. First, Himachal Pradesh is known as the „Fruit Bowl of Nation“ and „Apple state of India“.

Cropping patterns have been changing in favor of fruit crops, spices and vegetables in many states of India over a period of time at the cost of food grains. Himachal Pradesh is also not an exception. The state Himachal has set a good example of crop diversification, especially towards horticulture crops over time especially after the green revolution period. During the late sixties, crop diversification towards fruits and vegetables had started in some areas of Solan, Kullu, Shimla, and Lahaul & Spiti districts. This process of crop diversification has gained momentum and now it has spread to many other areas in lower and middle mountainous districts. Sharma (2011) stated that Himachal Pradesh has emerged as „a leading producer of fruits and off-season vegetables in the country and a model of agricultural development for other hill and mountainous states to follow“. In recent years, studies are not available for such changes in trends and patterns with respect to cropping patterns and crop diversifications. Therefore, it assumes significance to carry out a study on this aspect for Himachal Pradesh.

Second, as a horticulture crop and as an important fruit crop, apple has some distinguishing features. Apple is one of the perennial crops, once planted, it gives fruits or output for several years. Therefore, its input requirements and Production processes are different from other annual crops like sugarcane or seasonal crops like paddy or
wheat. The analysis on the problems and prospects of apple crop cultivation, therefore, requires a different set of data,

methodologies and analysis tools. Third, apple is the most important and dominating fruit crop grown in Himachal Pradesh which constitutes about 49 percent of the area and 85 percent share in total fruit crop production (Economic Survey, 2017). Apple is considered as the capital intensive and riskier compared to other food crops.

At the same time, apple is also a high-value crop. Farmers cultivating apple crop, compared to other crops, feel having high social status and prestige. Apple crop has various influences on the overall economic development of the state, directly and indirectly. Therefore, an in-depth study on the problems and prospects of apple crop and suggesting various measures to remove problems also assumes significance. In view of above motivations and significance, the present study attempts to analyze the trends and patterns of apple crop (with respect to area, production and productivity), production behavior, profitability, and constraints etc. in the cultivation of apple in Himachal Pradesh by using both the secondary and primary survey data.

Productivity

Productivity isn’t everything, but in the long run it is almost everything. A country’s ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker. Paul Krugman, *The Age of Diminishing Expectations* (1994).

Productivity is commonly defined as a ratio between the output volume and the volume of inputs. In other words, it measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output. Productivity is considered a key source of economic growth and competitiveness and, as such, is basic statistical information for many international comparisons and country performance assessments. For example, productivity data are used to investigate the impact of product and labour market regulations on economic performance.

Productivity growth constitutes an important element for modelling the productive capacity of economies. It also allows analysts to determine capacity utilisation, which in turn allows one to gauge the position of economies in the business cycle and to forecast economic growth. In addition, production capacity is used to assess demand and inflationary pressures.

Apple growers in Himachal Pradesh, one of India’s major apple-producing regions, are upbeat that increased rainfall activity would result in sufficient moisture to help the fruit to gain optimum size. This would also raise overall apple production after a lean season. The state Horticulture Department said harvesting of the fruit has just begun in low apples belts, mainly in Shimla district, that alone accounts for 80 per cent of the state’s total
apple production. This year’s production of apples in the hill state is estimated at 40 million boxes with an improvement over last year’s 30 million boxes, Horticulture Director JP Sharma told IANS. More than 90 per cent of Himachal Pradesh’s apple produce goes to the domestic market.

Apples constitute 49 per cent of the total area under fruit crops and 85 per cent of the state’s fruit economy comes to Rs 4,000 crore. The Economic Survey of 2020-21 stated that the area under apple production in the state had increased from 400 hectares in 1950-51 to 1,14,144 hectares in 2019-20. The production was normal with 70 million boxes in 2019-20. Currently, the harvesting of apples is going on in areas like Jubbal, Kotkhai, Rohru, Kotgarh, Nerva and Karsog. According to Gowar, productivity measures the efficiency with which the inputs are transformed into outputs. Swaminathan, M.S., defined productivity as output value divided by input value multiplied by changes in environmental capital stock.

The present study addresses the following research issues:

What have been the trends and patterns of apple production in Himachal Pradesh? What are the socio-economic factors which influence production of apples in study area? What are the input variables which influence the apple productivity? What is the nature of the cost of production and profitability from apple cultivation in the study area across categories of sample farmers? And What are the constraints faced by cultivators during the process of apple cultivation and what remedial measures should take for sustained production and economic growth? Himachal Pradesh is the second largest apple producing state of India after Jammu and Kashmir. It provides employment not only to the farmers but also to the labours at the time of pre and posts harvesting process like pruning, applying fertilizers and pesticides, picking, grading, packing etc.

Shimla district was selected out of 12 districts for the study. The selection of these district as a study area was influenced by a few reasons. First, Shimla is highest apple producing district of the state. Second, apples from districts especially are known for their natural colour, sweetness, and succulence. Third, the districts have joint Agricultural Produce Market Committee “Shimla and Kinnaur”. And the last reason was that the both districts come under same division, i.e., Shimla division.

Profile of Shimla District

Shimla is present capital of state Himachal Pradesh and it came into existence 1st September 1972. It lies between the latitude 30°-45° and 31°-44° North and longitude 77°- 00° and 78°-19° east and its elevation range from 300-6000 meters. It is surrounded by Mandi and Kullu districts in the north, Uttarakhand state in the south, Kinnaur district in the east and Sirmaur district in the west. The climate in Shimla is moderately warm during summer and cold during winter. Temperatures in district range between 4°C to 31°C over the year.
Shimla has a population of 814010 persons with 425039 males and 388971 females. In the district 75.26 percent of the population is rural and 24.74 percent is urban. The population growth rate is 12.67 percent and density of 159 people per square kilometer. The sex ratio of the district is 915 females for every 1000 males. The average literacy rate is 83.64 percent with 89.59 percent of male literacy and 77.13 percent female literacy.

Shimla has divided into seven sub-divisions which are Shimla Urban, Shimla Rural, Rampur, Theog, Rohru, Chopal and Dodra Kwar. The district has twelve tehsils and five sub-tehsils. It has ten development blocks named Theog, Rampur, Narkanda, Basantpur, Rohru, Jubbal & Kotkhai, Mashobra, Chiragaon, Chopal, and Nankhari. The number of Panchayats is 363 and census villages are 3231. The people of district speak Hindi and Pahari dialects. The population consists of Hindu, Sikh, Muslims, and Buddhist. The scheduled caste people are consists of Kolis, Lohars, Chamars, Channels, Dumne, Rehars and Julaha.

The economy of the Shimla district is mainly dependent on agriculture/horticulture sector and tourism. The source of livelihood of people is agriculture and it is the largest fruit producing district of the state. For the study, Dhamwari and Shiladesh village of Chhuhara block was selected from Shimla district (Figure 1).

Figure 1: Sketch Map of Study Area in Shimla District (Himachal Pradesh)

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Objectives of the Study:

The specific objectives of the present study are:

To examine the trends and patterns of area, production and productivity of apple crop in Himachal Pradesh,

To examine the influence of socio-economic characteristics on apple production based on primary data,

Hypotheses of the Study:

The present study is based on three hypotheses.

Some socio-economic variables like age of the farmer, gender of the farmer, size of the family, educational qualification of the head etc. have significant and positive influences on the production level of apple crop,

Input variables like land under apple cultivation, number of saplings, quantity of fertilizers used, quantity of pesticides used, number of labor etc. also have significant positive effects on production of apple,

- There is no significant difference between literacy level of respondents and their level of knowledge on apple production.

- There is no significant difference between occupation category of the respondents and their level of knowledge on apple production.

Data Sources and Methodologies:

The data set for the study is collected from both secondary sources and primary field surveys. Main secondary data sources are government databases such as the National Horticulture Database (Government of India) and State Department of Horticulture (Government of Himachal Pradesh). The primary survey data sets were collected at the household level from four sample villages of important apple producing district (Shimla) in Himachal Pradesh. The selection of the district is based on few economic reasons. First, Shimla is the highest apple producing district in the state which contributes about 67 percent (499422 million tones, 2013-14) of total apple production in Himachal Pradesh. Apples are very popular for their color, sweetness and good quality. The districts have common APMC (agricultural produce market committee), which is situated in Shimla. Most probably some productive districts come in the same agro-climatic division.
Primary Data Collection

The primary field survey was made during the months of December 2020- January 2021 on interview basis for the year 2020-21. On the basis of the highest and lowest apple production norms, two development blocks were selected from district Shimla, shimla & block Chhuara.

Profile of Surveyed Villages

The production of apple crop does not only depend on uses of inputs like fertilizers, pesticides, labours, cultivation practices but also depend on the social and economic characteristics of the cultivators. Therefore, in this section, attempts were made to study the socio-economic characteristics of different categories of apple cultivators (marginal, small and large farmers), such as household”s landholding, age, gender, education level, main occupation, size of household, total household income etc.

Distribution of Sample Cultivators According to Landholding

The household samples were collected from two villages named, Dhamwari and Shiladesh. In the samples of 40 respondents, were from 49 respondents were from Dhamwari village (22 percent) and 24 respondents were from Shiladesh village (11 percent).

Distribution of Sample Cultivators by Annual Income

Income helps to know the economic condition of farmers. Agriculture, especially apple production, is the main source of income for people in the study area. Other sources of income involved, small business such as glossary shop, tailor shop etc., and labour work under the „The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)‟.

Result & Discussion

It reveals that In Shimla district Jubbal & Kothkai block accounts highest share in apple production which is 28.7 percent followed by Rohru 14.8 percent, Rampur 13.6 percent, Narkanda 10.8 percent, Chopal 9.2 percent, Theog 8.2 percent, Chiragaon 7.8 percent, Nankhari 5.7 percent, Mashobra 0.8 percent and Basantpur 0.45 percent.

The production in Theog block has increased from 24471 million tonnes to 40953 million tonnes, Rampur 17145 million tonnes to 67822 million tonnes,Narkanda3 2236 million tonnes to 53938 million tonnes,Basantpur1400 million tonnes to 2247 million tonnes, Rohru 39850 million tonnes to 73915 million tonnes, Jubbal&Kothkai 85720 million tonnes to 143334 million tonnes, Mashobra 2413 million tonnes to 3995million tonnes,
Chiragaon 18883 million tonnes to 38955 million tonnes, Chopal 23195 million tonnes to 45997 million tonnes and Nankhari 14467 million tonnes to tonnes.

The annual growth rates for all blocks were positive during the period 2018-19 to 2020-21. The growth rate for Rampur was highest 295.58 percent followed by Chiragaon 106.3 percent, Chopal 98.3 percent, Nankhari 95.39 percent, Rohru 85.48 percent, Theog 67.35 percent, Narkanda 67.32 percent, Jubbal & Kothkai 67.21 percent, Mashobra 65.56 percent and Basantpur 60.51 percent. The growth rate for Shimla district was 92.25 percent at given period.

This chapter has provided an overview of apple production in Himachal Pradesh and India. Descriptions on apple production for districts in Himachal Pradesh and blocks have also been given.

India was the fourth (2.98 percent) highest apple producing country after China, USA, and Poland in 2014. The growth rates in the area, production and productivity of apple fruit in India has increased from the first period (1991-92 to 2000-01) to the second period (2001-02 to 2015-16). Jammu & Kashmir is the highest apple producing state in India followed by Himachal Pradesh (31 percent), Uttarakhand, and Arunachal Pradesh.

In state Himachal Pradesh, Shimla, Kullu, Mandi, Chamba, and Kinnaur are major apple-producing districts accounting about 99 percent of the total production of the state. Shimla and Kinnaur districts (study area districts) account for around 75 percent share in apple production of Himachal Pradesh. In Himachal Pradesh, the annual compound growth rate in apple crop area has been positive and significant in every sub-period (first period 1981-82 to 1990-91, second period 1991-92 to 2000-01 and third period 2001-02 to 2020-21). But this positive growth rate in apple crop area has been lower in recent decade (2.77 percent) compared to during 1990s (3.57 percent) and during 1980s (3.71 percent).

Within Himachal Pradesh, the area growth rates in apple crop varied across districts even though every district recorded positive growth rate in each sub-period. In Shimla district, the growth rate was higher in the second period (3.04 percent) compared to recent decade (1.95 percent) and during 1980s (2.75 percent). Kinnaur district recorded higher growth rate (around 4 to 7 percent) in apple crop area in every decade compared to Shimla district and also Himachal Pradesh as a whole.

The apple crop production recorded a positive and significant growth rate of 2.81 percent during 1981-82 to 2013-14. But this growth rate was lower than during 1980s (5.07 percent) and during 2000s (4.59 percent). The period of 1990s recorded a negative growth rate in apple production. Like area growth, apple crop production growth rates varied across districts. While Shimla recorded 2.57 percent growth rate in apple production, Shimla recorded a negative output growth rate during 1991-92 to 2000-01.
The productivity growth rate in apple crop has not been satisfactory for Himachal Pradesh as well as in major districts. The first sub-period (1981-82 to 1990-91) showed a positive yield growth rate of 1.33 percent. But subsequent sub-periods of 1990s and 2000s recorded a negative growth rates in yield of apple crop. The overall period (1981-82 to 2020-21) for Himachal recorded a negative growth in yield of 0.2 percent although it was not statistically significant. Shimla and other districts recorded positive growth rates in apple yield (0.74 percent and 2.56 percent, respectively) during 1981-82 to 2013-14. But other districts witnessed a negative yield growth in apple during the same period. In all developmental blocks in Shimla and Kinnaur districts, apple production increased from 2018-19 to 2020-21. The percentage increase was much higher in all blocks of Shimla district than in other district.

**Summary & Conclusion**

The present study related to apple production and productivity in Himachal Pradesh during the period under study. The rising average under fruits has been the most striking feature of fruit growing in Himachal Pradesh. During the last few decades, orchards have shown a reasonably wider spatial spread and a notable increase in production. The spatial spread of fruits however, varies markedly over the state.

Apple covers 40 percent of the total area under fruits and constitutes nearly 60 percent of total production of fruits. It was first of all introduced at Kotgarh in district Shimla. This area formed the traditional node of its diffusion in the state. The fruit consolidated its position in this area and spread to surrounding areas where secondary nodes got established later. The proposed hypothesis in this regard therefore is proved. Apple presently is an outstanding cash crop of Himachal Pradesh with excellent quality apple being cultivated in the state. The state is often designated as “Apple State” which seems an appropriate epithet.

Higher concentration of this commercial crop is associated with the cool temperate climate and considerable high altitudinal location of central parts of the state falling over Shimla, districts. The development of infrastructural facilities such as transport, marketing in addition to the government and political support to the growers have significantly contributed to maintain the supremacy of apple in the apple-growing belt of Himachal Pradesh.

The fruits (other than apple) have shown both expansion and contraction in area. Some fruits like nuts and dry fruits, citrus and mango have experienced expansion on a limited scale. A few others like plum and peach have experienced a contraction in area. To a large extent, the expansion of area under citrus and mango has been at the cost of agricultural crops. The diverse agro-climatic conditions, undulating terrain and a combination of many other factors have been responsible for the spatial diffusion of other apple crops also in the state.

The vast tracts of land, which are sloppy or were unsuitable for growing cereals such as wheat, rice, maize etc., due to a wild growth of grass have largely been put to fruit growing. Beside the physical factors, the spatial spread of these other fruits is also attributed to the development of transportation network particularly during the second phase. The construction and extension of the National Highway 22, State Highways and construction of many other metalled roads have given a major boost to the expansion of apple production. It has been observed that more than 60 percent of apple production have come up within two Kms distance from motor able road. Mostly, roads are being utilized for transporting the produce to the markets. Besides these, the
coming up of various Progeny-cum-Demonstration apple/ Nurseries, Regional Research Centers have been very helpful in providing the growers with the latest and high fruit bearing varieties of plants.

Further, the establishment of Horticulture Produce Processing and Marketing Corporation (HPMC), the Y.S. Parmar University of Horticulture and Forestry which conducts Kisan Melas annually for growers, subsidies on chemical inputs and fertilizers and loan and credit schemes of the government, expedited for the spread of apple production in Himachal Pradesh during the second phase of diffusion.

Labour is a basic input for the grower without which the continuation of the process of orchard farming is almost impossible. Human beings as well as animals are put to use for carrying out all the orchard-related activities. The migrant labour from neighbouring hilly states has contributed towards expansion process of orchards in Himachal Pradesh.

As regards the implications of diffusion of orchards, it has directly impacted on the ecology of the state. The soil erosion which prevailed on thousands of acres of valuable land has reduced after fruit trees were planted on the affected area. This has also been manifested from the case studies. The growing of fruit trees has offered advantages on low fertility soils. It has been found through case studies that over a number of years, the trees accumulate large quantities of nutrients and their extensive root systems are able to exploit the sub soil for moisture. With the expansion of fruit cultivation, many grazing lands have gone out of use for grazing the livestock. This has been found to have resulted into decline in livestock heads on the farms and also into the related soil erosion. However, the increased fruit cultivation has been responsible for deforestation for meeting the requirement of packing cases. Most of this requirement is now being met by corrugated cartons prepared from wood of eucalyptus and popular which is imported from neighbouring states.

The coming up of fruit orchards has brought a significant change in the social life of the people especially housing pattern of growers of fruits in Himachal Pradesh. The sample houses reported a better ventilation, more space and electricity supply along with more electric gadgets, furniture’s and modern amenities. The personal conveyance has become an important part of the status of the growers. Cars, scooters, tractors-trolleys and trucks are owned by a number of growers. In-migration of labour for carrying out orchard related activities has also affected the society of Himachal Pradesh. To some extent the availability of manpower in timely execution of apple production has been found as a positive aspect for diffusion. This labour has contributed to the expansion of orchards in its own way.

An activity has also affected the economy of the state positively. It has been found that the apple crop were bringing higher returns as compared to the field crops from the same amount of land. As a result, most of the farmers replaced grain cultivation by planting fruit trees on considerable part of their farm-land. Also, the fruit growers utilized their labour force the year round in various activities such as planting, mulching, irrigation, pruning, grafting, plucking, carrying the produce to the packing sheds, packing etc. This was not possible in case of grain cultivation where the labourers could not be involved throughout the year. This finding of the study does not lend support to the hypothesis that apple production have failed to absorb surplus agricultural labour.

The state economy has also gained from diffusion of orchards by way of increase in domestic income and promotion of tourism. The cultivation of fruit trees on wider areas have added to the greenery of the state which is an added attraction for thousands of tourists each year. Besides these, a number of small-scale
industries associated directly or indirectly with orchard industry have come up during the study period giving a boost to state’s economy.

The case studies of orchards shed interesting light on diffusion of orchards in Himachal Pradesh. The varying altitude, climate and soils have a strong bearing on diffusion at the micro level also. These case studies reveal that the orchards falling in the mid altitude zone (temperate zones) have recorded a higher expansion in their size as compared to those in the low hills. Their additional area came up close to the motor able road. The orchards in these temperate areas are more fragmented than those in the low hills. Most of the case studies have reported severe shortage of labour and of trucks during peak fruit season. However, in low-hill areas these problems have not been given higher rank. Also the case studies of temperate zone have shown greater diversion of area from field crops to fruit crops, as compared to the case study orchards in the sub-tropical zone. The process of diffusion of orchards, however, has been affected adversely by various problems such as excessive or scanty rainfall, absence of adequate irrigation basically for apple crop. Fragmented land holdings, shortage of labour and packing material are also basic problems of the growers.

Most of the growers have reported dissatisfaction over the provision of pesticides, chemical inputs like sprays and non-availability of quality saplings. The provision of roads by the government although has been reported as a big facility by all the selected growers yet many villages in the interiors are still not linked by metalled roads. The facilities for storage of fruits during bad weather are also lacking. Besides this, the marketing of fruits is a big problem.

The growers often feel that they are exploited by the commission agents and the middlemen. Inspire of these problems, persistence of higher profits from fruit cultivation has motivated the farmers not only to shift to apple farming but also to plant apple trees on many additional areas. This has provided a permanent green cover to the affected area and protection against the menace of soil erosion. Thus, the activity has bright prospects provided the problems related to it are taken care of. There is a strong need to further develop the transport network. More number of processing plants, warehouses, collection canters is required to be set up in different parts of the state in order to realize the full potentials of orchard farming.

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