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Implications of Diffusion of Orchards in Himachal Pradesh: A Geographical Appraisal

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Abstract
Himachal Pradesh, a mountainous State of India is located in the Western Himalayas has the climatic conditions and topography that are conducive to the growth and production of a variety of fruits. Himachal Pradesh hosts a number of orchards that have grown overtime and have had a great impact upon the ecology, society and economy of the State in several ways. Fruit cultivation is probably the only cash cropping system in which concerns for the environment and the economic output go hand in hand to the extent that they are paramount in Himachal Pradesh's orchard belts today. While on the one hand greater adoption of fruit farming has brought in economic prosperity on the other it has improved the environment. It has brought larger profits to the growers which they have re-invested in improving their social conditions. A detailed discussion of these impacts becomes inescapable in any study into the fruit farming growth and expansion in the State. The present paper is an attempt to study the implications of the diffusion of orchards on the ecology, society and economy of Himachal Pradesh. The findings are based on both primary as well as secondary data.
Keywords: Orchards, diffusion, ecology, environment, economy, climatic conditions

Introduction

Himachal Pradesh has an impressive record of diffusion of orchards that had been initiated as early as the early 1960's. The hectrage of fruits increased immensely from negligible in the year 1950 to 2,32,000 hectares currently. The production of fruits in the State at present is 5 lakh metric tons. Among the fruits, apples dominate the fruit landscape of the State while other fruits like peach, pear, mango and certain citrus varieties have also contributed to the economy. Lately, the cultivation of fruits like kiwi and pomegranate has been encouraged among the orchardists of Himachal Pradesh.

Table 1: Demographic Profile of the State

Sr. No.		Himachal Pradesh	All India
1	Population (million) (Census 2011)	6.8	1121
2	Decennial Growth Rate (%)	12.94	17.64
3	Population Density per sq. km.	123	382
4	**Sex Ratio (Females per 1000 males)**	**972**	**943**
5	Rural Population	89.96	68.84
6	Literacy Rates	82.80	73.0

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7	Forest Area as a %age of total Area	66.5%	21.0%
8	Net Area Sown	11.9% of total culturable area	45.8% of total culturable area

Source: Statistical Abstract – CSO & DES
http://mospi.nic.in/sites/default/files/cocsso/2_HimachalPradesh.pdf
The per capita GSDP in HP is Rs. 1,30,511 but the agriculture GSDP per cultivator is only Rs. 49,032 which is one of the lowest in the country.

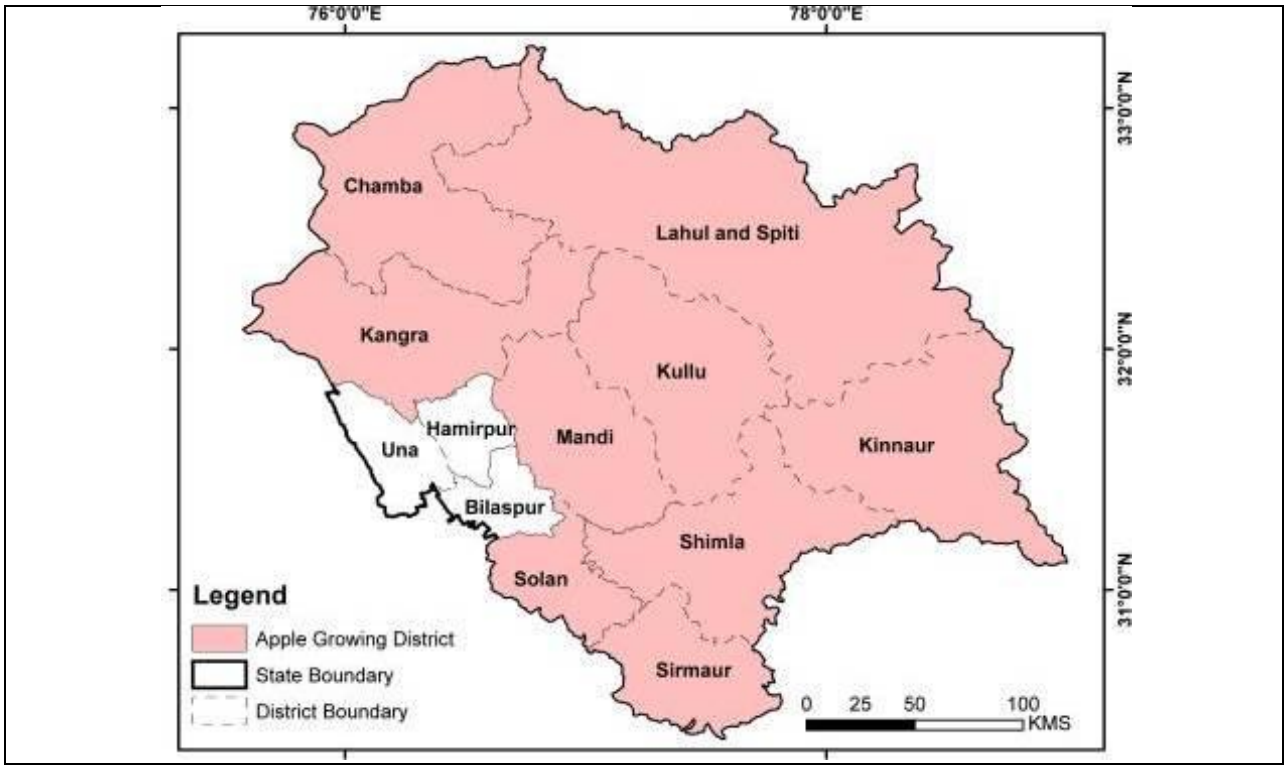
Objectives

There has been observed both a positive as well as a negative impact of the diffusion of orchards on the ecology, society and economy of the State over space and time and this is the focus of this paper. The objective, thus, is to study the implications of orchards' diffusion on the ecology, society and economy of the Northern Hill State of India, Himachal Pradesh.

Research Methodology and Data Sources

Primary and secondary data has been collected from the Directorate of Land Records and the Directorate of Horticulture, Shimla. The primary data has been collected by interviewing around 100 orchardists settled in different parts of the State. They have been selected on random basis using the snow ball sampling method. The tools used for the primary data collection was a well structured pre-tested questionnaire for in-depth interviews. The Focus Group Discussion (FGDs) method was also used for collection of data and narratives. The area under orchards is depicted in Map I.

Map 1: Location of Himachal Pradesh in India and all the 9 Apple growing districts of the State



Source; Sahu et al. (2020)

Discussion: Implications of Diffusion of Orchards

The implications of diffusion of Orchards have been classified on the basis of the following categories:

I. Impact on Ecology
II. Impact on Society
III. Impact on Economy

I. Impact on Ecology

Orchards have directly affected the ecology of Himachal Pradesh as thousands of acres of valuable fertile land which had been persistently suffering from soil erosion over the years were taken care of when these lands were brought under fruit crops.

Table 2: Production of all Fruit in Himachal Pradesh

Sr. No.	Item	2012-13	2013-14	2014-15	2015-16
1	Apple	412.39	738.72	625.20	777.13
2	Other Temperate Fruits	55.02	66.13	43.61	35.73
3	Nuts & Dry fruits	2.81	3.48	2.41	3.37
4	Citrus Fruits	24.32	22.27	22.17	26.62
5	Other Sub-Tropical Fruits	61.16	35.73	58.55	85.98
	Total	555.70	866.33	751.94	928.83

Source: http://mospi.nic.in/sites/default/files/cocsso/2_HimachalPradesh.pdf

An analysis of the primary data collected from the apple belt of the State, especially in Shimla district, shows that the problem of soil erosion has decreased measurably with the development and growth of the fruit orchards. There were observed 98 percent of the growers participating in the survey who were of the opinion that those large tracts of their land, which had been rendered useless due to the problem of landslides had actually become productive and resilient to erosion because of the planting of apple trees. The orchard plantation process has successfully reduced this problem to a large extent. There are, no doubt, certain areal variations. The growers of stone fruits in areas of Sirmaur district were reportedly not much affected by the problem of soil erosion but is a genuine one with the planting of orchards taking care of guarding against the exploitation of the environment. Control of water logging for example by planting pear trees in the affected orchards has been reported by a few of the growers in the Rajgarh tehsil as an effective prophylactic. Similarly, a number of growers in the Solan belt have reported that soil erosion had decreased visibly in the fields where fruit trees were cultivated as compared to the fields where agricultural crops were being grown. As a result many of the respondents have replaced the regular food crops with orchards in the fields that suffered from soil erosion. In this context the extension of fruit cultivation has to a large extent saved the soil of these areas from being eroded away. It is one of the important reasons that has been quoted for the shift towards the planting of orchards.

Several orchardists, however, in the case of orchards of mango and citrus fruits located in the western parts of the State, among whom there were 80 percent who had complained about the problem of soil erosion caused by the incessant seasonal floods occurring in the local choes. These fruit growers have reported that the parts where mango trees had been in existence since earlier times

face the problems of erosion at a much lower intensity. The later growth of fruit trees has checked soil erosion even in the catchment areas of some of the great hydel projects like Bhakra Dam, Pong Dam and the Beas-Satluj Link project located in Himachal Pradesh. On the whole, the growers in apple and stone fruits belts have reported lesser incidence of soil erosion as compared to growers in the lower hills.

The growing of orchards has resulted in advantages that include the enrichment of the low fertility soils. Over a number of years, the trees tend to accumulate large quantities of nutrients because their extensive and deep root systems are able to exploit the subsoil for moisture and nutrients. Many growers have highlighted the fact that the trees generate their own nutrients by decomposing the leaves and twigs and reabsorbing them after they had undergone decay and become rich resources for forming the upper soil layer. These trees are comparatively stable and are better enabled to withstand the concomitant variations in temperature, rainfall and humidity of the region.

(i) Impact on Livestock

The expansion of orchard activity has been observed to be detrimental to livestock rearing in Himachal Pradesh according to accounts of some rural respondents. The regions wherever the shift has taken place towards fruit cultivation there has been recorded a marked decline in the number of heads of livestock as compared to the regions where such a shift has not been observed.

Table 3: Entrepreneurial Activities Promotes in Himachal Pradesh as per 6th Economic Census

Sr. No.	Major Activity	Own Account Establishments	Establishments with at least one hired worker	Total Establishments
1	Agricultural Service	1333	109	1442
2	Livestock	28206	570	28776
3	Forestry & logging	466	112	578
4	Fishing & Aqua culture	1227	33	1260
5	Total Agricultural Activities	31232	824	32056
6	Total Non Agricultural Activities	272013	108171	380184
7	Total Agricultural & Non Agriculture Activities	303245	108995	412240
8	%age share of Agriculture in Total	10.30	0.76	7.78

Source: http://mospi.nic.in/sites/default/files/cocsso/2_HimachalPradesh.pdf

It has been noted that 100 percent of the hill dwellers had been domesticating animals before adopting fruit cultivation. Many of them have since left off animal rearing or had gradually reduced

the numbers. The percentage of livestock heads had declined to about half in the North-central and eastern parts of Himachal Pradesh largely comprising the current apple belt. The stone fruit growing areas of the Southern parts of Himachal Pradesh also experienced a similar decline. The western parts of the region, where citrus and mango fruits have been given importance, have reported least decline. There were about 85 percent of the growers who continued raise livestock. Infact, these parts of the State have a higher proportion of flat land on which other consumption and cash crops are sown. The livestock are strongly associated with this type of cultivation in the State.

(ii) Environmental Pollution – Impact on Soil, Water, Air and Forests

Another significant impact of the negative fallout of diffusion of orchards in the State has been the pollution of soil, water and to some extent the air due to the increased use of chemical inputs. It has been observed that 100 percent of the growers were using fertilizers and chemical sprays in their orchards. Nearly 70 percent of them were found to be aware of the harmful effects of chemical fertilizers on the soil which was largely because the harmful spraying of insecticides and pesticides on the fruit trees. They reported their helplessness in the increased application of these inputs which was attributed to their desire for higher returns in the market. None of the growers showed any concern for the bad effects of these Chemicals on the health of the consumers in general and the environment in particular.

Nearly 10 percent of the growers reported that the expansion of the orchards and the increase in production of fruits in Himachal Pradesh has led to subsequent deforestation, through the increase in demand for packing boxes. Most of this demand was met by felling trees from which packing cases were made for marketing the fruits. However, it has been very difficult to assess the extent of the damages and the overall loss due to expansion of fruit farming. The trees like silver fir, spruce and chir pine were decimated extensively as they were mostly being used for manufacturing packing cases. Currently, these trees and a number of dependant species of flora and fauna have become endangered.

(iii) Endangered Forests and Alternatives to Orchard Expansion

The expansion of apple orchards thus, has been more harmful to the forest wealth, as compared to the stone fruit orchards and the sub-tropicals. This is because, apple constitutes more than 60 percent of the total fruit production of the State and hence its demand for packing cases has been much higher. The government of Himachal Pradesh has started taking steps for protecting the forests from being denuded for this purpose. In the early 1980's, a law was passed forbidding the felling of trees in the forests for meeting the requirement of packing cases required by the fruit producers. The growers were allowed to purchase packing cases from a few fixed sawmills entrusted to the State Forest Corporation. These saw mills were provided wood by the government from selected trees.

Further, in the late 1980's, corrugated paper board cartons were introduced as an alternative to wooden cases. There was 100 percent positive response initially from the fruit and especially apple growers as these were much cheaper than the wooden cases. This satisfaction level was short-lived because there were complaints that these boxes proved most unsuccessful during the monsoons as they absorbed moisture and collapsed. Therefore, they were totally useless for storage and transportation during the rains.

In 1990, the government imposed a total ban on the felling of trees and nearly 80 percent of the growers complained of a sharp shortage of imposed packing cases. This shortage was met initially by

the supply of wood from the neighbouring States of Punjab and Haryana. The consequent glut of eucalyptus and poplar timber led to the development of mutually beneficial trade with the supply of wooden packing cases from the plains to the hills. The growers are continuing to get wood from these two states for making packing cases. Around 70 percent of the growers, when interviewed, reported about their satisfaction on the supply of this timber while 30 percent complained of the poor quality of the wood. Lately, factories in the Kala Amb region in Sirmaur district and Baddi Barotiwala in Solan district are known for the manufacture of carton boxes and crates for growers across the State. It is estimated that the increase in fruit production in the future might probably result in an acute shortage of wood. Therefore, advance planning is essential because timber reaches a stage of maturity in 8 to 12 years depending on the particular species. Himachal Pradesh is poised to explore the potential of producing poplar trees in the State's plain areas like parts of Solan, Una, Kangra and Sirmaur, which have proven ideal for the cultivation of these specific tree species. It is proposed that, the river beds, across 'nullahs' or streams and 'khads' or stop dams can be best utilized for plantation. These steps would make the State self sufficient in meeting the wood requirement for packing cases to a certain extent and also save the precious forest resources from getting depleted. The development of orchard activity has, therefore, proven useful for sustained environmental conservation in the State.

Examining the benefits to the environment it can be stated that fruit trees have provided permanent green cover to the soil and acted as soil binders. They have prevented soil erosion and helped in retaining the essential and vital nutrients, which would otherwise have been lost as a result of erosion.

II. Impact on Society

(i) Improved Standards of Living

Fruit growing has impacted greatly on the standards of living of the hill people. No doubt the standard of living of the people of a region is judged by the production and consumption of fruit per capita. The statement that cultivation of fruits contributes to the health, living standards and prosperity of the people of an area has been found to be true in the case of Himachal Pradesh. Micro level studies have shown that none of the growers participating in the survey reported the deterioration of their health or the health of their family members on account of an increase in the consumption of fruits. Some of them reported a negative effect brought on by the use of a variety of potentially dangerous chemical sprays used on the fruit crops, which tend to enter indirectly into their food chain and causing latest yet potent harmful effects.

Table 4: Himachal Pradesh: Changes in Standards of Living

Sr. No.	Variable	Growers as percent of Total	Duration after the shift
I	**Housing Types**		
	'Pucca'	40	10 years
		25	15 years
	'Kutcha'	15	Already Built
		20	n.a.

II	**Electric and Electronic Gadgets**		
	T. V. Sets	5 45 40 10	Already had 10 years 15 years Without T.V. Sets
	Refrigerators	75 10 15	15 years 20 years No Refrigerator
	Electric Churner, iron and heater	5 70 20 5	Already had 15 years 20 years Without these
III	**Mode of Conveyance Used Personally**		
	Car/Scooter Tractor/ Trolley No Conveyance Trucks	60 20 20 20	15-20 years 15-20 years n.a. 20 years

Source: Field Work

As shown in Table - 4 above there were about 40 percent of the growers who had built *pucca* houses within 10 years of adopting fruit cultivation and another 25 percent after 15 years (Table – 1). Around 15 percent of the fruit growers were already living in *pucca* houses. Interestingly, 20 percent of the growers are still staying in *Kutcha* houses. In some cases the houses have changed from *Kutcha* to *pucca* houses and have even worked on them to make them more spacious by adding on more rooms. The houses have been expanded upon to make them more spacious and ventilated, than earlier. The availability of electricity, furniture, chairs, cots, expensive utensils and various modern amenities have become a feature of almost all homes. The sample study showed that 45 percent of the growers had purchased television sets after 10 years of adopting orchards as an economic activity whereas, another 40 percent has purchased them after 15 years. Only 5 percent had already owned television and 10 percent growers were still unable to have televisions. Refrigerators were common among growers dwelling in the lower hills of the South - western parts of Himachal Pradesh comprising Una, Hamirpur, Bilaspur, Solan, and parts of Sirmaur. Refrigerators were bought by 75 percent of the growers after 15 years of having adopted fruit cultivation and 10percent who had bought it after 20 years. The remaining of 15 percent of the growers did not own a refrigerator. (This could probably be because they did not feel the necessity of buying one in the already cool climate). The electric churner, iron and heater were bought almost simultaneously and 90 percent of the fruit farmers reportedly own these three items.

Table 5: Sex wise Employment Under the Agriculture Sector

Sr. No.	Major Activity	Male	Female	Total
1	Agricultural Service	1616	108	1724
2	Livestock	19281	17585	36866
3	Forestry & logging	1167	256	1423

	Fishing & Aqua culture	1315	50	1365

Source: http://mospi.nic.in/sites/default/files/cocsso/2_HimachalPradesh.pdf

Most of these were observed to have been purchased after 15 years of adoption of fruit cultivation. About five percent of the growers do not posses these items even now. The personal conveyance has also become an important part of the status of the orchardist. It was reported that after about 15-20 years of fruit cultivation, there were 60 percent of the growers who owned either a scooter two wheeler or a car (four wheeler) and 20 percent said that they owned a tractor- trolley. Trucks were also owned by 20 percent of the growers. A majority of the growers have reported that they invested a major part of their incomes on procuring these amenities. This is clearly indicative of the fact that growing fruits has been profitable for the farmers. The consequent boost in the economy has gone a long way in raising the standards of living of the growers.

(ii) Educational Attainment among Fruit Growers

Education has been recognized as an essential part of the social system. The educated growers (95 percent) gained knowledge from the varied sources of knowledge and information made available to them by different institutions like the horticulture university, demonstration orchards, Kisan melas etc.

Table 6: Himachal Pradesh: Educational Status of Orchardists and Families

Sr. No.	Family Members	Educated (Percent)
	Self	95
	Wives	70
	Kids	99

Source: Field Work

The orchardists probably realized early on that they could enhance their profits from fruit growing by increasing their levels of awareness and knowledge. It was observed that 70 percent of the growers had educated wives who helped them in the proper utilization of their farm-incomes as well as maintenance of meticulous information about the production and sale. Interestingly, 99 percent of the growers participating in the survey were sending their children to school essentially and then onto college and even universities to pursue higher education. The objective overall was to match upto to the international standards of fruit production and development and growth of the fruit economics backbone of the State (Table 6).

Table 7: Level of Education Among Orchardists in Himachal Pradesh Growers (1951-2018)

Sr. No.	Year	Illiterate (%)	Primary (%)	Middle (%)	High (%)	Graduate (%)	Post- Graduate (%)
1	1951-1960	**30.8**	**30.8**	0.0	7.7	30.8	0.0
2	1961-1970	**5.3**	**7.9**	5.3	26.3	36.8	18.4
3	1971-1980	**13.0**	**1.9**	5.6	33.3	40.7	5.6
4	1981-1990	**8.3**	**0.0**	4.2	41.7	37.5	8.3
5	1991-1995	**0.00**	**5.3**	10.7	33.3	40.7	10.0
6	2001-2010	**0.00**	**2.4**	12.6	33.5	39.5	12.0
7	2011-2018	**0.00**	**1.0**	13.0	33.0	40.0	13.0

Source: Field Work

Table 7 depicts the level of education among the growers and shows that this has steadily improved. In the beginning in 1951, a majority of the growers had attained schooling upto the primary level (5th standard) while the percentage of matriculates was lower i.e. 7.7 percent as compared to the following years whereby the percentage increased with each passing decade thereafter. The percentage of illiterates was also higher in the 1950's which became nil after the year 1991 onwards.

About 20 percent of the growers participating in the study sample belonged to the socio-economically lower sections of the society and among these 60 percent are educated. These growers have been provided with higher subsidies as compared to the growers belonging to the general category. It is apparent that their higher educational attainment has enabled them to benefit more from orchard cultivation, as compared to others. The resultant economic prosperity has weakened the caste barriers as these communities currently enjoy as equal status in the society. There seems level of equality among the orchardists despite their belonging to different castes. There is apparent a peculiar solidarity emanating from shared experiences.

(iii) Raised Demand for Migrant Labour

The increase in demand for labour in the orchards has led to increase in volume of migrant labour in the State. The primary data collected from 100 apple orchardists shows that during the fruit season Gorkha labour from Nepal migrates to the apple growing areas. It has been found that 90 percent of the orchardists hired migrant labour in their orchards while the remaining 10 percent worked on their orchards with their families and local labour. This indicates the importance of migrant labour in the economy of the state.

The stone fruit growers are also dependant upon the labour force from outside Himachal Pradesh. The packers for careful and attractive packing of these fruits is brought from Delhi by 100 percent of the growers. About 30 percent of the growers involved their families in various orchard related operations. There were 50 percent who were dependent upon the local labour for various jobs while the remaining 20 percent orchardists imported labour from other States. Employment of local labour is a trend more popular and prevalent among the stone fruit growing areas. The mango and citrus fruit growers also depend mostly (80 percent) largely upon the local labour and the practice of imported labour is observed to be prevalent of the only in 20 percent orchards in these areas.

The migration of labour from other States to Himachal Pradesh has observably brought larger earning capacity and higher profits to the orchardists due to the timely and rapid performance of various orchard related operations like pruning, plucking, packing, carrying transporting etc. The orchardists thus were in a profitable position but the influx of migrant labour had a negative impact on the hill communities society as this increased not only the population pressure on the state but also the added burden of the migrants sharing the available resources of the State which were barely sufficient for the available proportion of the growers.

The orchards, as has been already mentioned earlier, are labour intensive operations and are observed require attention as well as activities all through the year. No doubt these orchards give lucrative employment to a large number of workers and helps them improve their living conditions by making essential purchases with the money they can earn by working in the orchards. Thus, this section of the society has benefited directly and indirectly from the diffusion of orchards in the State.

III. Overall Impact of the Orchards on the Economy of Himachal Pradesh

The steady spread of fruit farming in Himachal Pradesh, during the period under reference (1951-

2018) has not been without economic progress manifested through a number of facets. It has been a well-established fact that properly maintained and established orchards offer much higher yield per unit area as well as returns in comparison to the other cultivated crops from the same piece of land.

(i) Diversification of Groups

An analysis conducted on the performance of orchardists of Himachal Pradesh has brought into light the fact that almost 70 percent of the growers have shifted from food crop growing to fruit growing. Among these about 40 percent of the growers have completely left the cultivating of agricultural cash crops. Around 10 percent of these participants in the study have reported that growing food crops was a more tedious and less profitable occupation and because of this they have chosen fruit crop cultivation as a better substitute. The sizeable shifts to the orchards has largely been done due to higher economic returns from orchards as compared to the cultivation of food crops.

Himachal Pradesh Horticultural Marketing and Processing Corporation Limited (H.P.M.C) is a State public undertaking established in Himachal Pradesh works on marketing fresh fruits and vegetables, processing the unmarketable surplus and marketing the processed products. Since its inception, H.P.M.C. is providing remunerative returns to the fruit growers for their produce.

Table 8: Area under Apple Cultivation in Himachal Pradesh (In Hectares)

Sr. No.	Date	Area under Apple Cultivation	Growth in Percentage
1	2008-09	97438	00.0
2	2009-10	99564	2.13
3	2010-11	101485	1.89
4	2011-12	103644	2.08
5	2012-13	106440	2.63
6	2013-14	107686	1.16
7	2014-15	109953	2.06
8	2015-16	110679	0.66

Source: Economics and Statistics Department, Himachal Pradesh (2017)

The analysis shows that in 25 percent of the cases, the income was more than double the total expenditure, whereas in another 30 percent of the cases it was observed to be almost three times the expenses incurred.

(ii) Support to Small Scale Industries

The orchards have been providing raw materials to a number of small scale industries in the State. One of these was generated by the persistent demand for wooden boxes during the earlier times when these boxes were required for packing the apple, peach, plum, apricot, almond and mango fruits. This initiated the setting-up of saw mills in these areas. About 100 percent of the apple, plum, peach orchardists have reported selling their produce in these boxes. However at a later stage it was realized that using wooden boxes was adversely impacting the ecology of the hills. This has led to a shift to the use of corrugated-fibre-board cartons and gunny bags for packing. Sub-quently the has

packing houses with cold room facilities were set up in Ghumarwin (Bilaspur) and Nadaun (Hamirpur) Refrigeration facilities have also been provided for in the cold stores situated in Audi (Kurmarsain) Jarol-Tikker (Kumarsain), Gumma (Kotkhai), Rohru (Rohru) and Patlikuhl (Kullu). These lie in the apple rich belt of the State. About 10 percent of the apple growers have been reported to have been utilizing the facility. Besides these, cold stores are situated in Kangra, Mandi, Sirmaur, Solan and Una which are being utilized for storing fruits grown in these areas. There are also plans of increasing the capacities of grading and packing houses from 3,380 metric tonnes to 10,000 metric tonnes in the State.

The processing plants have opened up especially in the peach belt where few varieties for canning purposes have been sport lighted to be growing. These have further contributed positively to the economy of the State. Canning and food processing plants at Rajgarh and Bagthan came as a welcome relief to the peach growers. It has been observed that half of the growers sell about 10-15 percent of their produce to these units.

Another processing unit in Dhaula Kuan (Sirmaur) processes the citrus fruits and other sub-tropical fruits of the State. It was reported that 20 percent of the growers sell their fruit produce partially to the plant. The processing unit at Parwanoo (Solan) produces juices, pulps, jams and squashes from the variety of fruits supplied by the growers of the neighbouring districts of Shimla and Rajgarh. There 0are plans for upgrading the processing plants at Parwanoo and Jarol as well as setting up others in the State.

(iii) **Government Initiatives**

The H.P.M.C situated in Shimla has established packing houses at Gumma, Rohru, Tatapani, Jarol-Tikker, Oddi, Rekong Peo, Giobong, Shunter, Rajgarh, Chai!, Patlikuhl, Janjheri, Rajpura, Shoolini and Churah. These centres are equipped with the latest mechanisms of washing, grading and scientific packing, cold storaging, ware housing and processing the non-marketable fruits. The growers of Shimla and Mandi have been utilizing this facility of extent of about 20 percent whereas in the case of Rajgarh, there were 5 percent growers who avail themselves of the packing house facility in Rajgarh. These small-scale industries have impacted positively on the economic status collectivity and individually of the fruit growers of the State and these are being utilized by them for improving the production of fruits. This is contributing positively to the economy of the regions and the economy has been influenced tremendously by the diffusion of orchards especially through the generation of employment which at present comes to about 900 lakh mandays and promotion of tourism in the state. About 1.50 crore to 3 crore apple boxes are exported from Himachal Pradesh each year thereby contributing to the income of the State.

The dispersal of orchards in the State has therefore, indirectly not only enhanced the State income but it has generated employment, promoted tourism and caused the development of several small scale industries like those devoting to packaging, transport, refrigeration etc. there are also industries for ancillary products like the wine industries. Other avocations directly and indirectly dependent upon the orchard activity have also improved upon the occupation and income generation of the States, population. Along with these a large fleet of transport vehicles particularly trucks in the apple and stone fruit areas, tempos, tractor - trolley types vehicles in the mango and citrus regions have been functional transport for the orchard produce. This number has been increasing every year. This provides income to the State exchequer by way of varied avenues of taxation.

A large number of markets, wholesale and retail shops have also come up for the distribution of the

orchard produce. This has provided sustainable and lucrative livelihoods to a large number of families in the State and elsewhere.

Conclusions

The diffusion of orchards has proved beneficial to the land, people and economy of Himachal Pradesh especially because large chunks of land have been saved from being eroded away by the monsoonal rains. The fertility of the soil has been maintained by addition of plant debris to the otherwise depleted soils. Diversion of the land area from crop cultivation to fruit growing has saved the soils from recurrent depletion. However, the increase in orchard activity has led to the degradation of true forests especially by cutting trees to fulfill the enhanced demand for packing cases.

The social impact of the growth of orchards has been equally impressive. The activity has definitely helped in raising the standards of living of the growers. A large number of growers could earn profits which they invested on the construction of improved housing purchase of modern gadgets, provision of adequate conveyance and education to their children.

The improvement of the orchards in themselves as well as the entire belt as a whole has increased the net income of the farmer and the earnings are higher as compared to the early period of diffusion. The benefits of growing fruit trees have accrued to all the farmers irrespective of the acreage and size of the orchard. Other groups of people, whether they are consumers, labourers, transporters, commission agents or tourists all have benefiited from the diffusion of fruit orchards in the State, during the study period.

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