FARMER'S PERCEPTIONS FOR HIGH DENSITY APPLE PLANTATION IN DISTRICTSHIMLA OF HIMACHAL PRADESH

Project Report

by

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(H-2018-15-MBA)

submitted to

Dr. YASHWANT SINGH PARMAR UNIVERSITY
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CERTIFICATE-I

This is to certify that the project titled, **"Farmer's Perception for High Density Apple Plantation in District Shimla of Himachal Pradesh"** submitted in partial fulfillment of the requirements for the award of degree of Master of Business Administration in the discipline of Business Management ofDrYashwant Singh Parmar University of Horticulture & Forestry, (Nauni) Solan (HP)-173230 is a bonafide research work carried out by Mr. Neeraj Mehta Son of ShriSatish Mehta under my supervision and that no part of this project has been submitted for any other degree or diploma.

The assistance and help received during the course of investigation have been fully acknowledged.

Place: Nauni, Solan **Dr Rashmi Chaudhary**
Dated: **Project Advisor**

CERTIFICATE-II

This is to certify that the project titled, **"Farmer's Perception for High Density Apple Plantation in District Shimla of Himachal Pradesh"** submitted by Neeraj Mehta (H-2018-15-MBA) son of ShriSatish Mehta to Dr. Yashwant Singh Parmar University of Horticulture & Forestry, (Nauni), Solan (HP) – 173230 India in partial fulfillment of the requirements for the degree of Master of Business Administration in the discipline of **Business Management** has been approved by the Advisory Committee after an oral examination of the student in collaboration with the External Examiner.

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I am grateful to my parents and siblings for instilling in me the values that make me the person that I am.

Date:

Place: Nauni, Solan

(Neeraj Mehta)

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INTRODUCTION

Apple is the most important temperate fruit crop of the North-Western Indian Himalayan region. It is fourth among the most widely produced fruits in the world after orange, banana and grape. China is the leading apple producer in the world. In India, it is grown in Kashmir, Himachal Pradesh, hills ofUttrakhand and its cultivation also extended to Nagaland, Sikkim, Arunachal Pradesh and Meghalaya. India's share in the total apple production of the world is only 2.0 per cent. In India, the total area under apple cultivation is 250 thousand hectares producing 1470 thousand MT fruit with a productivity of 5.9 tonnes/ha (Singh, 2011).

The state of Himachal Pradesh is the second-largest producer of apple in India and also known as the fruit bowl of the country. The fruit crops are economically more viable than cereals, pulses and off-season vegetables. Due to its profitability, the area under fruits in the state has been increasing at a very rapid rate. In the high hills, apple is most important fruits crop and account for about 80 per cent of the area under total horticultural crops. But in mid-hills, stone fruits are more popular while kinnow and santra in lowhills.

The hilly areas of Himachal Pradesh have high agro-climatic suitability for production of high-value crops like fruit.In such areas, self-sufficiency in food grains should not be the goal of the development policy as this would mean under-utilization of resources. Under such situation, maximizing the income from scarce land resource should be the objective. This can be achieved by emphasizing the cultivation of compatible fruit crops rather than traditional field crops. The development of these crops has greatly fulfilled the needs and objectives of socio-economic growth in the state. Among various fruit crops grown in the state apple dominate in the area as well as production. Over the period, apple orchards have been able to bring spectacular transformation in the income level of orchardists, but now, the continuing decline in the availability of cultivable land, rising energy and land costs together with mounting demand for horticultural produce has given a thrust to the concept of high-density planting (HDP) having higher income and low gestation period (Srivastva, 2017). The high-density apple plantations align with the trend of optimum utilization of available space-both horizontal and vertical to achieve the maximum level of production per unit of the area by way of accommodating the maximum number of plants in a given area. Whereas with the existing extensive system of the plantation, not only the yield per unit of area is low but the gestation

period of the plantation is comparatively long and the plants being vigorous which poses the problems in management. For overcoming these problems, high-density plantation as followed in Europe, United States of America and now is being gradually taken up in the state.

The conceptual background of high-density planting (HDP) reveals that it was pioneered for temperate fruits in Europe. There has been a steady increase in tree planting density over the last 50 years from 70 trees/ ha to > 6000 trees/ha. High-density orchards were first planted in Europe at the end of 1960 and since then there is a decline in traditional orchards with low densities. Heinicke (1975) developed the Central Leader system in North America and this system was planted at a density of 300-700 trees/ha utilizing semi-dwarfing rootstocks and was widely adopted. During the late 1970s and early 1980s, a significant number of growers in the USA began planting more compact trees on M.9, Mazzard, Quince rootstocks at much higher tree densities (1000-1500 trees/ha) to achieve higher early yields. A significant trend in the late 1980s was to increase planting density in slender spindle orchards to improve light interception and thereby improve both early and mature yields (Oberhofer, 1987). During the early 1990s, much higher tree densities between 4000-6000 trees /ha were tested in single rows in either a vertical tree shape or V-shape. A more narrow tree form was developed which was named the Super Spindle system (Nuberlin, 1993) and this system had extremely high early yield and excellent fruit quality. Another significant trend during the late 1980s and 1990s was a greater emphasis on the use of highly featured trees to obtain significant yield in the second year after planting. At the end of the century, there was a great disparity of opinion among growers on which system was the most profitable with some growers using densities above 5000 trees/ha and some growers continuing to use densities below 500 trees/ha with the majority of growers planting densities in between of 500-5000 trees/ha.

CATEGORIES OF HIGH-DENSITYORCHARD

There are the following categories of high-density orchards:

- **Low-Density Planting (LDP):** It accommodates 100 plants/ha and there is no use of dwarfing rootstocks, minimum training and pruning, trees come into commercial production potential after 10-15 years and yield during early years was verylow.
- **Medium-Density Planting (MDP**): It accommodates 250-500 plants/ ha. It requires proper pruning, gives more yield and quality fruits and has a long productive life.

- **High-Density Planting (HDP):** It accommodates more than 1000 plants/ha. It requires rigorous training and pruning, dwarfing rootstocks and chemicals to maintain optimum growth. Here both yield and expenses are higher and the establishment and maintenance of HDPs require technicalbackup.
- **Ultra High-Density Planting (UHDP):** It accommodates more than 2000-5000 plants /ha. It requires severe pruning and training, proper canopy management, chemical assistance and nutrient management and also requires technicalbackup.
- **Super High-Density Planting (SHDP):** It accommodates more than 10,000-40,000 plants/ha. Here severe top pruning is practised similar to the mowing of grassland, heavy use of growth regulators as well as judicial canopy management and tree yields after 1 or 2 years after planting. In apple, 10000 plants/ha can be accommodated at a spacing of1 x1m.

The high-density plantation system not only ensures precocity in production but also increases yield substantially with a better quality of theproduce. Recently, more interest has been generated in the cultivation of high-density apples in India. The plants grafted on high-density rootstock have given good results due to higher yield as well as the plants coming into bearing stage easily and resulted in better quality fruits and the cost of production per unit of fruit is also reduced considerably. As now, there are small numbers of high-density varieties of apple orchards in Himachal Pradesh and almost all the orchards are of traditional rootstock having very low planting density. The high-density plantations are being raised only as gap fillers or a few new orchards. This is also very natural to expect as nobody will cut the existing orchard for growing high-density apple plants.

NEED OF STUDY

The present scenario of high-density apple plantation is not very encouraging in the state. The high-density varieties of rootstock plantation have been adopted by generally, progressive and large growers and very popular in lower heights in the state. Thus, such plantation is not concentrated in one area/pocket and mostly these rootstocks were used as filler in standard varieties of apple. The large growers are uprooting their standard variety apple orchards and practising semi, high-density apple plantation. Moreover, the availability of information concerning the benefits of high-density plantations and the availability of the desired rootstock is crucial for popularizing these plantations. But the fact that high-density plantations are

entirely different from the traditional orchards in respect of plantation density, productivity, management practices etc, and their cost structure may be significantly different from the present orchards. Keeping this in view, a large number of high-density plantation in Shimla district the present study has been conducted in Shimla district. Therefore it becomes, important to study the perceptions of farmers towards high-density plantation of apple and to know about the challenges faced by farmers for adopting the high-density apple plantation in Himachal Pradesh. It is with this background that the present study was conducted with the followingobjectives.

B. OBJECTIVES:

1. To study the perceptions of farmers about the high-densityplantationin Himachal Pradesh.
2. To study the challenge faced by farmers for adopting the high-density plantation of apple.

Chapter-2

REVIEW OF LITERATURE

The following studies were reviewed for the present study.

Cahn and Goedegebure (1992) studied the economic aspects of apple production with tree density and results showed that long term profitability of apples increased with increased tree density upto 5000 trees/ha. Also, the payback period (4^{th} year) analysis decreased with increased tree density.

Fukuda (2001)in his study assessed the farmers'viewpoint on the high-densityplantation of apple in Japan.The author reported that high-density plantation resulted inincreasingthe production and productivity of apple per hectare. The study reported that 70 per cent of farmers in Japan adopting dwarfing rootstock techniques like M-9, M-26, M-106, M-111 etc. The results of the study also revealed that 90 per cent of apple grower in Japan had less than 2 hectares of land under orchard and it was the major reason for the adoption of high-density plantation in apple.The study reported that M-9 and M-26 rootstock was mostly used in the high-density plantation of the apple fruit crop. The study also concluded that dwarfing rootstock resulted in full yield within 5-6 years after planting, while in seedling it took 10 years to grow.

Meland (2005) studied high-density planting systems of European plums-the effect of growth and productivity of three cultivars after nine years and proved that the Y-trellis system is an efficient way to increase both early and cumulativeyield.

Deodhar (2006) reported that most of the apple orchards in India are nearly 30 years old and even older and are characterized by declining yield and lack of fruit uniformity in termsofshape,size,andcolour.Lowproductivitycomparedwithmostotherdomesticfruitas well as other apple-producing countries raises apple prices relative to substitute foods and limitsgrowthindomesticapple consumption. It isunclearifttheproductionconstraint imposed by terrain and climate can and will be overcome by the introduction of improved varieties and cultivation practices.

Palmer (2006)conducted a study on the perception offarmers' principles and pitfall in high-densityapple farming in New Zealand. The finding of the study proved that high-density plantation in apple is a solutionfor the reduction of economic pressure in the apple market. The author concluded that the growers not only to understand the physical, biological and economic constraints but it is important to use harness tools and techniques of apple cultivating in the high-density plantation.

Robinson *et al.* (2007) observed an economic comparison of five high-density apple planting systems and found that the greatest profitability was with the slender axis system ($23,900), followed by the tall spindle ($23,400), super spindle ($19,200), the vertical axis ($17,100), and least for the low-density slender pyramid system ($9,000).

Elkins *et al.* (2008) observed the economic evaluation of high density versus standard orchard configurations; case study using performance data for Golden Russet Bosc pear and noticed that a high-density planting came into production sooner, showing a profit after six years compared nine years for the traditional planting and the cost of establishing the orchards were recovered after ten years in the high-density planting compared with twenty-one years for the traditional planting.

Milosevic *et al.* (2008) noticed a comparison of low-density and high-density plum plantings for differences in establishment and management costs and returns over the first three growing seasons – a mini-review and found that in the low-density planting, initial fruit bearing was attained by the end of the third growing season and a modest yield of 1.2 kg plum fruit per tree (399.6 kg ha–1) was obtained, producing a low gross income of € 79.92, representing just a 2.0% return on investment, when considering the average market price of € 0.2 kg–1 plum fruit in the years of study whereas in the high-density planting resulted in yields of 6.6 kg plum fruit per tree (8,250 kg ha–1) in total over the first three growing seasons, producing an income of € 1,650. This represented a 21.3 per cent return on investments associated with the establishment and maintenance of the high- density plum planting over the first three growing seasons.

Bhatia and Kumar (2009) conducted a study on twocultivarsofapplei.e.ScarletGalaandRedFujionEMLA-9,EMLA-26,EMLA-7,EMLA-106 and EMLA-111 rootstocks that were planted under high density with the spacing of 3m x 3m and wereevaluatedfortheirgrowthandyieldperformance.Based ongrowthandyield performance results of the study revealed thatScarletGalawasobservedbetteronEMLA-7andEMLA-111 whereas theperformanceof RedFujiwasbetteronEMLA-111,EMLA-7andEMLA-106.

Rana*et al.* (2009) reported that the production of apple has gradually increased but the productivity has fallen from 10.8 to 5.8 t/ha. The reasons they attributed to it are climate variability, soil, crop improvement etc. Among all the productivity reducingfactors, the climate isdifficulttomanage.Theyexaminedthe changeinclimaticparametersespeciallychillingunits and farmers perceptions in Himachal Pradesh over time and its associated changes in apple productivity.

Seavart and Long (2009) noticed financial and economic comparison between establishing the standard and high-density cherry orchard and found that the full production yield is 13,450 kg per ha in a standard-density orchard and 15,243 kg per ha in a high-density orchard. The break-even year in which gross income covers all previous years' economic costs is year 8 for the high-density orchard and year 15 for the standard-density orchard.

Lehnert(2010)in his study found that high-density apple system was more costly as compared to conventional method because in high-density system planting of a tree is more which increase the cost of establishment of an orchard. Moreover, the finding of the study also suggested that in the long run high-density apple orchards were more profitable than the conventional orchards.

Robinson (2010) studied high-density pear production: an opportunity for NY growers and noticed that the extremely high planting density of the super spindle achieved a yield of 1,000 bu/acre in the 4^{th} year and has continued to be productive indicating good long profitability followed by tall spindle having the moderate planting densities which also had high yields but with lower initial investment cost also have greater economic profitability.

Clements (2011) analyzed mini' apple orchard systems trial: a comparison of central-leader, vertical-axis, and tall-spindle apple orchard systems on three different rootstocks and found that the tall-spindle (TS) system planted on B.9 rootstock had the highest cumulative yield (1202 bu/acre) of Honeycrisp fruits during the 3rd, 4th and 5th seasons. The cumulative yield was almost twice that of the vertical-axis system.

Aditya*et al.*(2012) assessed the farmer awareness and perception of climate variability on the high-density plantation of apple growing region of KulluDistrict in HimachalPradesh. The finding of the study revealed that climate change condition has adversely affected the apple production and apple cultivation and has shifted towardsthe high-densityplantation. The study found that due to climate change orchardist was facing problems likedegrading, flavour, texture, colour, size and an overall depletion of productivity. The study reported that farmers have diversified agricultural practices for compensation of loss from apple crop and the farmers diversified to the high-density plantation in the low region area. The study reported that nearly 80 per cent of farmers are moving towards high-density apple varieties (gala,Oregon spur,red delicious) etc.

Petrisor*et al.*(2012) in his study assessed that high-density apple orchardin rootstock giving sample after the second year as compare to seedling apple plant. Findingin his study that in Chuj - Napoca area in Romania scientist and growers developed ten new apple variety (Florina, Jonagold, Jonica, Top red, Mutsu, Granny Smith, Golden Reinders, Gala, Topaz and Piniva) in M-9 rootstock and the scientist found that Topaz,Jonagold and Pinova producing more apple as compare to others variety. The authors concluded that M-9 rootstock produce the largest unit (50 t/ha) in some variety like, Topaz, Jonagold and Pinova which produce more in quantity, more colour and high shape.

Badiu*et al.* (2015) studied evaluation of economic efficiency of apple orchard investments and found that the most efficient technological system is the super-intensive one. This is explained by the fact that the system begins producing from the second year, that it is the most productive, and that it has the highest ratio of extra class apples (more than 80%), which are better appreciated on the market (both in terms of quantity consumed and in terms

of premium price).

Milkovich (2015) in his study found that the future of apple orchard is in the high-density plantation. The finding of the study suggested that future orchard system will be based on basic principles of modern orchard design like high light interception, good light distribution throughout the canopy, high early yield, simple canopies for partial mechanization and High Planting Density. Conclude that the Tall Spindle system for canopy management is the best growing system in rootstock with small modification which should reduce labour cost, improving fruit quality and quantity and boost in pruning and harvesting efficiency. The study also concluded that presently many growers planting 1000 -1500 tree per acre but in the future with the help of adopting ultra high density planting the farmers plant 3000-4000 tree per acre.

Zec*et al.* (2015) studied the influence of planting density on yield of peach and nectarine and found that in a dense planting all cultivars achieved significantly higher yield per unit area (22,120 t/ha) and reach full bearing earlier compared with semi-dense planting(20,500 t/ha) and standard-density planting(14,312 t/ha).

Rajbhar*et al.* (2016) observed the performance of high-density planting of mango (*Mangiferaindica L.,)* under the mid-western plain zone of Uttar Pradesh and found that after 11 years, the yields of the plots planted at 1111 trees per ha were more than ten times the yields of plots planted at 100 trees per ha (59 t/ha versus 5.9 t/ha).

Gaikwad*et al.* (2017) studied the effect of spacing on growth, yield and quality of mango and observed that highest fruit yield (21.4 MT) was produced in the closer spacing of 5 x 5m in cultivar Kesar.

Gulati(2017) in his study found that government of Himachal Pradesh raising fund through world bank funded project for 18,000 hectares for a high-density apple orchard in Himachal to improving the quantity and quality of apple fruits. The project is to be implemented under the ration of 80:20 between the world bank and state government of Himachal Pradesh which the main objective is to planting the existing apple orchard and replacing the senile orchard.

And also special provision has been made for irrigation facilities in 19,560 hectares which will cover the availability of water during summer and critical state of plant growth.

Kerutagi*et al.* (2017) analyzed the comparative economics of traditional viz high-density mango cultivation in Karnataka and observed that in high-density orchard, the average yield obtained was more (7.86 t/acre) than in traditional orchard (3.50 t/acre).

Ahad*et al*.(2018) in his study analyzed the requirement of nutrients for sustainable high yield and good quality fruit for a long period. The authors found that the plant uptake the nutrientfrom soil depend on soil texture, structure, moisture, temperature and pH level of the soil. In the tree 11 per cent of nutrient used for tree framework, 4 per centused for fruit, 60 per centfor leaves and 25 per centfor tree growth. The authors concluded that the nutrient plays an important role for making good quality fruit and quantity fruit using proper management of nutrient in an orchard.

Bhat (2018)study showed that with the help of high-density apple plantation apple trees resulted in higher and better quality fruits and require less spacing and low chilling hours as compared to conventional plants.

Kumar(2020) studied the performance of newly introduced apple cultivation on various rootstock under high-density plantations in the cold temperate region of Kinnaur. The experiment evaluated four apple cultivars 'Red Cap Valtod/MM 106', 'Red Velox/M9', 'Jeromine/M9' and 'Super Chief/MM 106', planted at a spacing of 2.5×1.0 m^2. The results of the studyrevealedthatgrafted'RedVelox'plantson M9 is superior in terms of growth, precedence, quality of fruit and productivity andrecommended togrowunderhigh-densityplantationsincold temperate conditions of Kinnaur, HimachalPradesh.

CHAPTER-3

MATERIALS AND METHODS

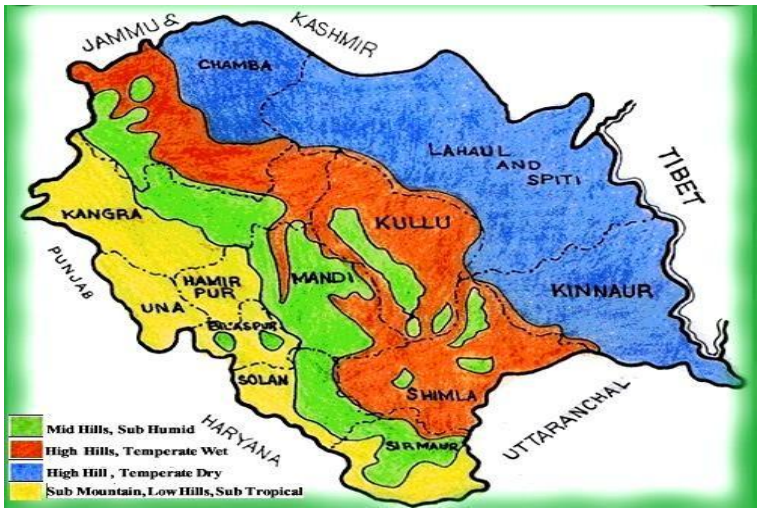
Thischapter presents the methodology used for the study and thus discusses the methodsadopted in the selectionofthesamples, thenatureandsources ofdataand thevariousstatisticaltoolsandtechniquesemployedinanalysing thedata. Research methodology deals with a systematic and scientific method that can be adopted to solve research problems. The methodology is a crucial step in any research because it directly influences the whole research and findings. Research process starts with defining the research problem, formulating hypothesis, design research, collecting data and finding interpretation and analysis of data to form a report.

The detailed research methodology followed for the present study is discussed below:

Selection of study area

Himachal Pradesh is divided into four major crop zones based on the agro-climatic conditions of the state. These are low hill subtropical zone, mid-hill sub-humid zone, high hill temperate wet zone, and high hill temperate dry zone. The present study was conducted in the high hill temperate wet zone of Himachal Pradesh. This zone occupies 35 per cent of the total geographical area and about 21 per cent of the cultivated area of the state. This zone comprises of Shimla, parts of Kullu, Solan, Chamba, Mandi, Kangra, and Sirmaur district.

Within the high-hill temperate wet zone, Shimla district was selected for the present study as this district has the highest area under apple cultivation in the state.



Selection of respondents:

Multistage random sampling was used for the selection of respondents for the present study.

- At the first stage, two blocks based onhigh-density apple plantation were selected from district Shimla.
- At the second stage, a list of high-density apple plantation dominant villages was prepared from each selected blocks and five villages were selected randomly.
- At the last stage, five farmers were selected from each selected villages for the collection of primary data.
- A sample of size 25 farmers was selected for the present study.

Data Collection

Two types of data have been collected for the present study.

Primary Data Collection

The primary data on demographic features such as family size and type, age, education status, occupation, economic parameters such as land inventory, perception and challenges of farmers for high-density apple plantationin various aspects were collected on well designed pre-tested schedules by adopting a personal interview method for respondents from the selected households in the study area.

Secondary Data Collection

Secondary data is a type of data that has already been published in books, newspapers, magazines, journals, online portals etc. The review of literature in any research is based on secondary data. The secondary data required for the study were obtained from the horticulture department of Shimla district.

Analytical Framework

To meet out the objectives of the study, appropriate mathematical and statistical tools, such as arithmetic mean, percentages, ratio, tabular were employed for analysis and interpretation of data.

Tabular and Diagrammatic Method

Socio-economic profile of the respondents in the study area was described by using tabular and diagrammatic methods.

Applied Analytical Tools:

Simple mathematical tools have been used for satisfying the objectives with a view of keeping the analysis simple and easy to understand.

Mathematical Tools: The information collected from the sample respondents was analyzed by applying the percentage method.

a.) Percentage:

The formula used for percentage method is:

$$P = \frac{X}{Y} \times 100$$

Where X= Number of respondents falling in specific category to be measured.

Y= Total Number of Respondents.

Limitations of the Study

i) The study is based on data collected for one year only i.e. 2020-21 which may not necessarily hold for other years as well.

ii) The results of the primary data may suffer from non-sampling errors although it is free from sampling errors.

CHAPTER-4

RESULTS AND DISCUSSION

The present investigation entitled "**Perception and challenges of farmer's for high-density apple plantation in district Shimla of Himachal Pradesh"** was conducted in the Shimla district with 25 sample respondents. Both primary and secondary data were used for the study. The primary data were collected through a questionnaire. The results obtained in the present investigation have been described and discussed character-wise under the following sub-headings.

- **Demographic profile.**
- **Perception and challenges of farmer's about high-density apple plantation.**
- **Challenges in high-density apple plantation.**

(A) Demographic Profile

The demographic profile of sampled respondents concerning age, gender and qualification were studied for better understanding the concerns and perception of the respondents towards high-density apple plantation. The detail of the demographic profile is discussed below:

4.1 Gender of respondent

Table and figure 4.1 depicts the gender-wise classification of the respondents. Analysis of the data reveals that out of the total respondents 96 per cent were males and 4 per cent were females. Majority of the respondents were males.

TABLE 4.1:GENDER OF RESPONDENT

Gender	Frequency	Percentage
Male	24	96
Female	1	4
Total	25	100

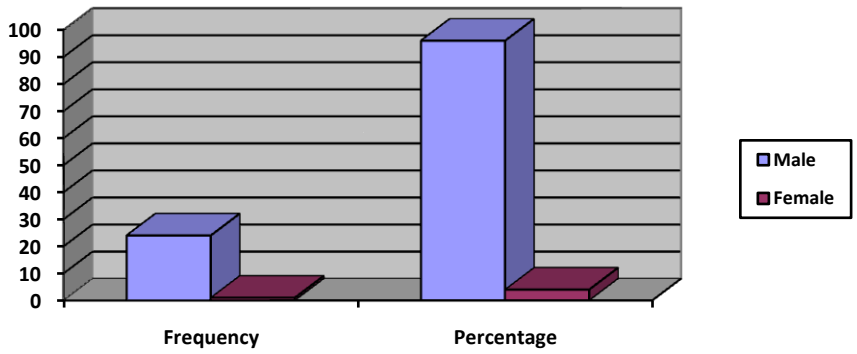


FIGURE 4.1: GENDER OF RESPONDENT

4.2 Age of respondents

Table and figure 4.2 shows the age-wise classification of the respondents. The analysis of the data shows that 52 per cent of the respondents were between the age of 20-30, 36 per cent of the respondent's age lies between 30-40 years and 8 per cent of the respondent's age lies between 40-50 years and 4 per cent of the respondents' age lies between 50 - 60 years.

TABLE4.2: AGE OF RESPONDENT

Groups	Frequency	Percentage
20-30	13	52
30-40	9	36
40-50	2	8
50-60	1	4
Total	25	100

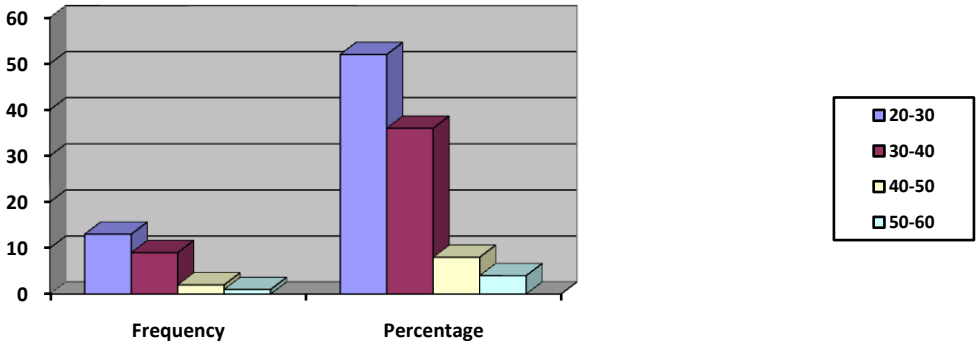


FIGURE 4.2: AGE OF RESPONDENT

4.3 Tehsil of respondent

Table and figure 4.3 show the tehsil wise classification of the respondents. The analysis of the data shows that 36 per cent of the respondents were from Rohru tehsil, 12 per cent of the respondents were from kumarsain tehsil, 16 per cent of the respondents were from theog tehsil, 12 per cent of the respondents were from Chirgaon, 4 per cent of the respondents were from Anni, 8 per cent of the respondents were from kotkhai, 8 per cent of the respondents were from rampur and 4 per cent of the respondents were from manali tehsil.

TABLE 4.4:Tehsil of respondent

Name	Frequency	Percentage
Kumarsain	3	12
Rohru	9	36
Theog	4	16
Chirgaon	3	12
Anni	1	4
Kotkhai	2	8
Rampur	2	8
Manali	1	4
Total	25	100

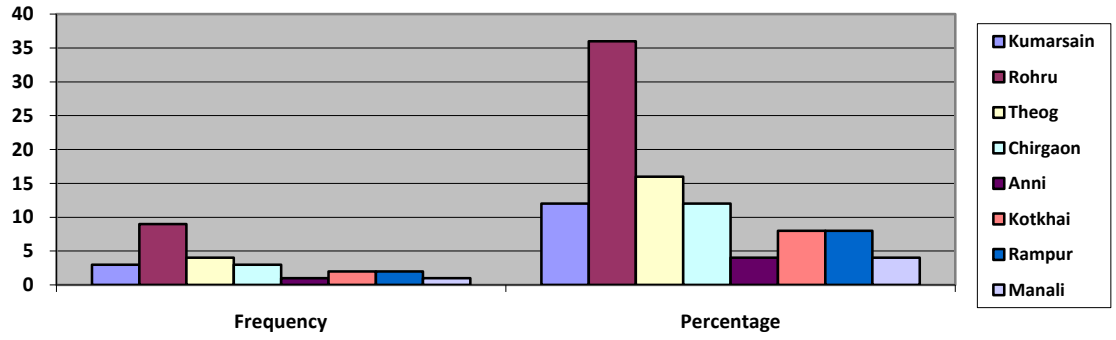


FIGURE 4.3:Tehsil of respondent

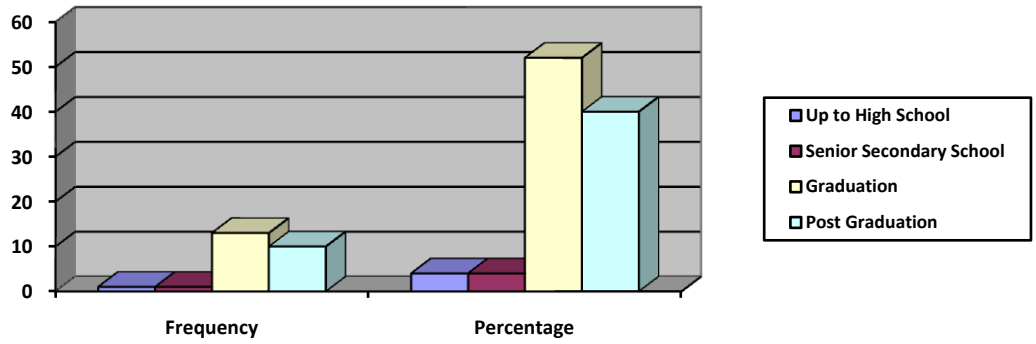
4.4 Education status of the respondent

Table and figure 4.4 shows the qualification wise classification of the respondents. The analysis of the data shows that 52 per cent of the respondents were graduate, 4 per cent of the

respondents were qualification up to high school and senior secondary school, and 40 per cent of the respondents were qualification up to post-graduation.

TABLE4.4 Education status of respondents

Qualification	Frequency	Percentage
Up to High School	1	4
Senior Secondary School	1	4
Graduation	13	52
Post Graduation	10	40
Total	25	100



FIGURES 4.4 Education status of the respondent

(B) Perception of farmers about high-density apple plantation

The perception of sample respondents concerningthe geographical area,different varieties, elevation height of orchard etc. were studied for better understanding the concerns and perception of the respondents. The detail of the perception of farmers towards high-density apple plantation is discussed below:

4.5 Number of years in high-density apple plantation

Table and figure 4.5 shows the number of years in high-density Apple plantation. The analysis of the data shows that 8 per cent of the respondents' number of years in high density was between 1-5 years, 60 per cent of the respondent's years between 5-10 years and 12 per cent of the respondent's years between 10-15 years, 4 per cent of the respondent's years in high density between 15-20years and 16 per cent of the respondents years in high density above 20 years.

TABLE 4.5 Number of years in high-density apple plantation

Years	Frequency	Percentage
1-5 years	2	8
5-10years	15	60
10-15years	3	12
15-20years	1	4
20-aboveyears	4	16
Total	25	100

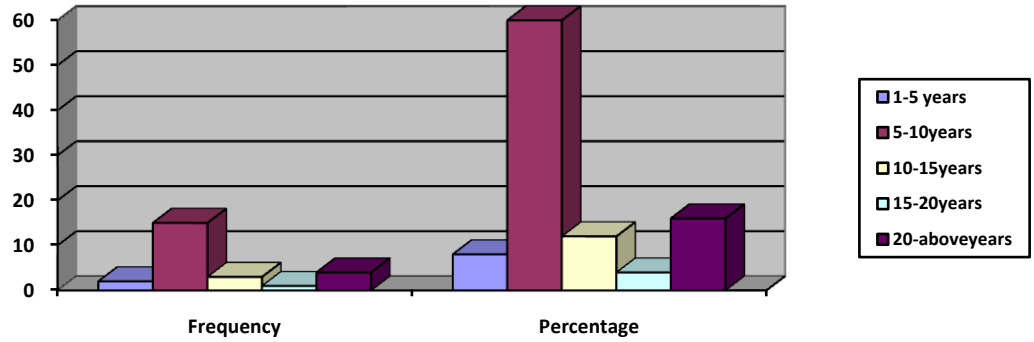


FIGURE 4.5 Number of years in high-density apple plantation

4.6 Geographical site of the orchard

Table and figure 4.6 shows the classification of the respondents based on the geographical site of the orchard. The analysis of the data shows that 32 per cent of the respondents' geographical site of the orchard was sunny side, 28 per cent of the respondents' geographical site of the orchard in the shaded side and 40 per cent of the respondents' geographical site of orchard located in both sides.

TABLE 4.6 Geographical site of the orchard

Geographical Site	Frequency	Percentage
Sunny Side	8	32
Shaded Side	7	28
Both Sides	10	40
Total	25	100

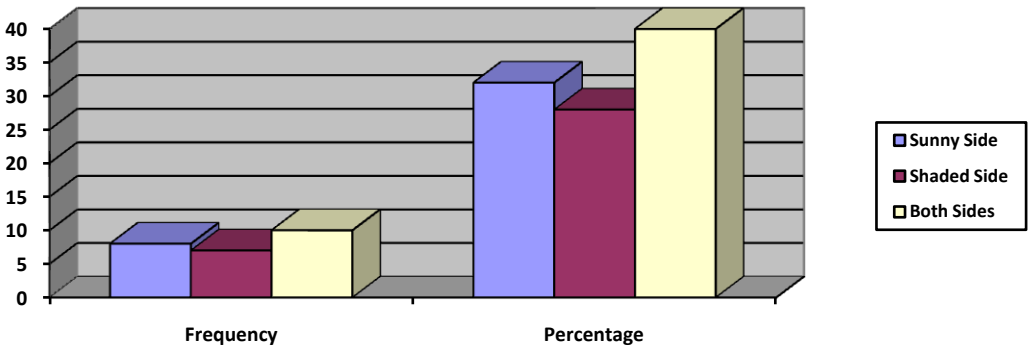


FIGURE 4.6Geographical site of the orchard

4.7New delicious variety in high-density apple plantation

Table and figure 4.7 shows the variety-wise classification of the respondents in the high-density plantation. The analysis of the data shows that red Velox and royal delicious variety were planted by 44 per cent of the respondents, gale gala variety was planted by 36 per cent of the respondents, jeromine variety was planted by 28 per cent of the respondents and 68 per cent of the respondents had planted other apple variety in high-density apple plantation.

TABLE 4.7New delicious variety in high-density apple plantation

Variety	Frequency	Percentage
Red Velox	11	44
Royal Delicious	11	44
Gale Gala	9	36
Jeromine	7	28
Others	17	68
Total	55	220

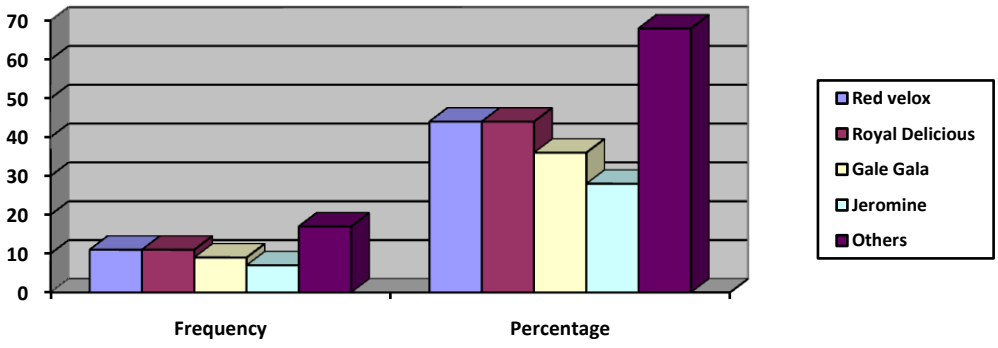


FIGURE 4.7New delicious variety in high-density apple plantation

4.8 Other variety of apple in high-density plantation

Table and figure 4.8 shows the other variety of apple planted by the respondents in the high-density plantation in the study area. The analysis of the data shows that 4 per cent respondents had red-golden, schingo, red love royal, dark Barron gala and superchief variety in high-density plantation, 16 per cent of the respondents had the granny smith and king rot variety, 8 per cent of the respondents had bulky gala, Hapke ace royal and Adams varieties and 12 per cent had scarlet 2 and other variety planted in their high-density apple plantation.

TABLE 4.8 Other variety of apple in high-density plantation

Variety	Frequency	Percentage
Red Golden	1	4
Granny Smith	4	16
King Rot	4	16
Bukey Gala	2	8
Schingo ,Chelan	1	4
Scarlet 2	3	12
Hapke ace royal	2	8
Red love royal	1	4
Dark Barron Gala	1	4
Superchief and Scarlet evasani	1	4
Adams	2	8
No variety	3	12
Total	25	100

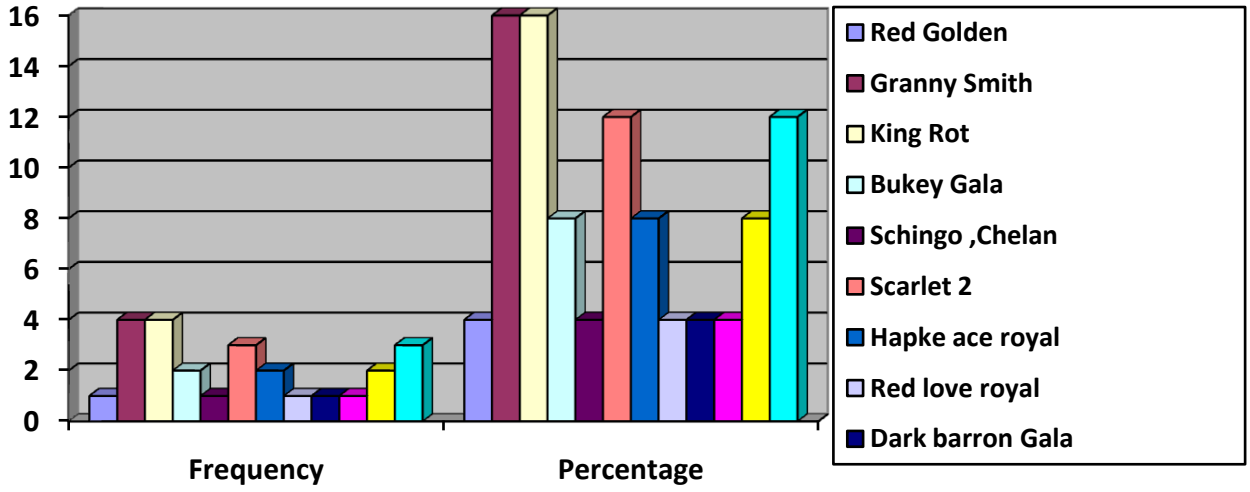


FIGURE 4.8 Other variety of apple in high-density plantation

4.9 Spur variety in high-density apple plantation

There were several varieties of Spur which is grown in high-density apple plantation. Spur Variety was the variety which is used for pollination and which variety is comes early as conpare to other delicious variety. Spur variety in High Density is also a big profit market in apple industry. Many farmers have planted spur variety in high-density apple plantation.

4.10 Another pollination variety in high-density apple plantation

Table and figure 4.10 shows the distribution of respondents based on another pollination variety in high-density apple plantation. The analysis of the data shows that 16 per cent respondents had planted gala and golden variety in high-density apple plantation, 8 per cent respondents had planted red June, Manchurian and red golden variety, 20 per cent had granny smith and 4 per cent had crab, pink lady,fuji, Tideman variety planted in their high-density apple plantation.

TABLE 4.10 Another pollination variety in high-density apple plantation

Variety	Frequency	Percentage
Gala	4	16
Pink Lady	2	8
Granny Smith	5	20

Red June	2	8
Golden	4	16
Manchurian	2	8
Crab	1	4
Pink lady	1	4
Fuji	1	4
Tideman	1	4
Red Golden	2	8
Total	25	100

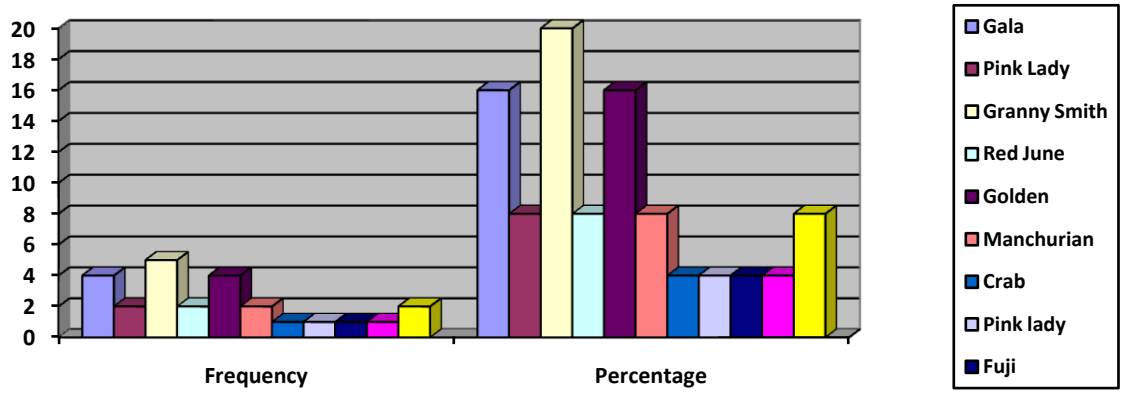


FIGURE 4.10 Another pollination variety in high-density apple plantation

4.11 Elevation height of orchard

Table and figure 4.11 shows the classification of the respondents based onthe elevation of their orchard from mean sea-level. The analysis of the data shows that 12 per cent ofrespondents orchard was located in the 2000-4000ft elevation range and 4 per cent of the respondents' orchard was in the 4000-5000ft elevation range. However 32 per cent of the respondents' orchard elevation range was 5000-6000ft, 36 per cent of the respondents' orchard elevation was between 6000-7000ft and 16 per cent of the respondents'had their orchard above 7000ft elevation.

TABLE 4.11Classification of the respondents based on the elevation of their orchard from mean sea-level

Height	Frequency	Percentage
2000-4000ft.	3	12

4000-5000ft.	1	4
5000-6000ft.	8	32
6000-7000ft.	9	36
7000-above ft.	4	16
Total	25	100

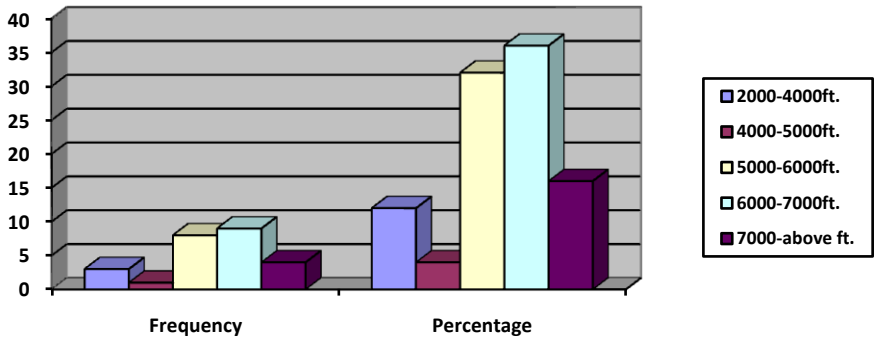


FIGURE 4.11Classification of the respondents based on the elevation of their orchard from mean sea-level

4.12Number of plants planted in the high-density apple orchard

Table and figure 4.12 shows the classification of the respondents based on the number of plants planted in high-density apple plantation. The analysis of the data shows that 60 per cent of the respondents had planted 100-500 plants in high-density, 20 per cent of the respondent had planted between 500-1000 plants in high-density, 16 per cent of the respondents had plantedbetween 1000-2000plants in high density and 4 per cent of the respondents' had planted between 2000-5000 plants in high-density apple plantation.

TABLE 4.12Number of plants planted in the high-density apple orchard

Plants	Frequency	Percentage
100-500	15	60
500-1,000	5	20
1,000-2,000	4	16
2,000-5,000	1	4
Total	25	100

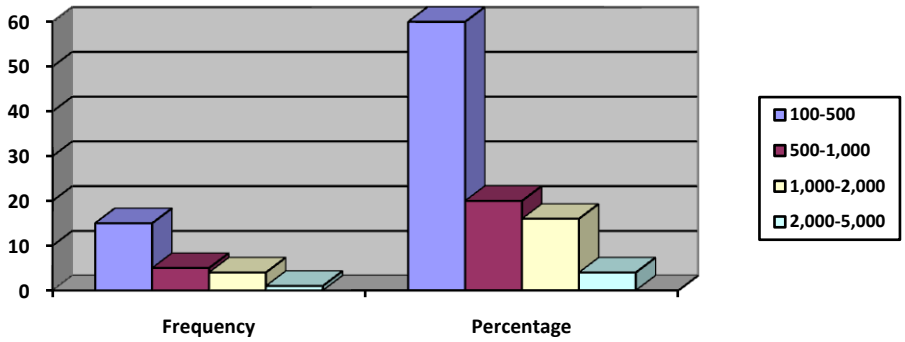


FIGURE 4.12Number of plants planted in the high-density apple orchard

4.13 Land under high-density apple plantation (Bighas, bishwa, square ft)

Table and figure 4.13 shows the classification of the respondents based on land under high-density apple plantation. The analysis of the data shows that 68 per cent of the respondents had 1-5 bighas land under high-density apple plantation, 12 per cent of the respondent'shad 5-20 bighas land and 8 per cent of the respondent'shad planted high-density apple plantation under 20-30 bighasland.

TABLE 4.13 Land under high-density apple plantation (Bighas,bishwas, square ft)

Bighas	Frequency	Percentage
1-5	17	68
5-10	3	12
10-20	3	12
20-30	2	8
Total	25	100

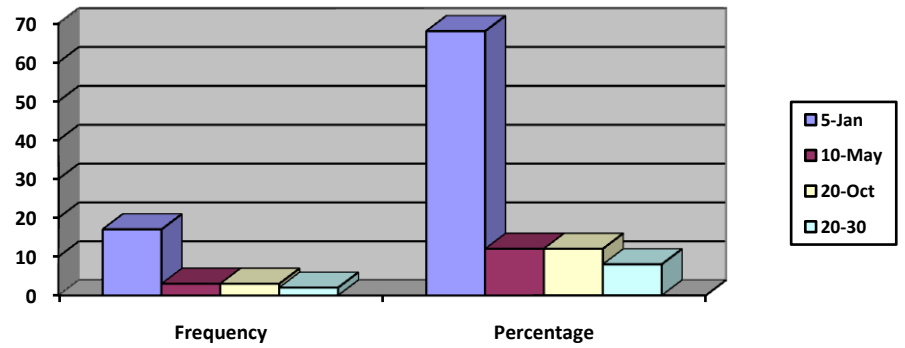


FIGURE 4.13 Land underhigh-density apple plantation (Bighas, square ft)

4.14Source of buying high-density apple plants

Table and figure 4.14 shows the various sources of buying high-density apple plants by the respondents.The analysis of the data shows that 24 per cent of the respondents had purchased plants from Dr.y.s.parmar university Nauni, 28 per cent of the respondents had purchased plants from the local nursery, 40 per cent of the respondents had purchased plants from outside the country and 4 per cent of the respondents had purchased plants from other resources.

TABLE 4.14Source of buying high-density apple plants

Name	Frequency	Percentage
Dr.Y.S.Parmar.Nauni	6	24
Local nursery	7	28
Outside the Country	10	40
Others	1	4
Total	25	100

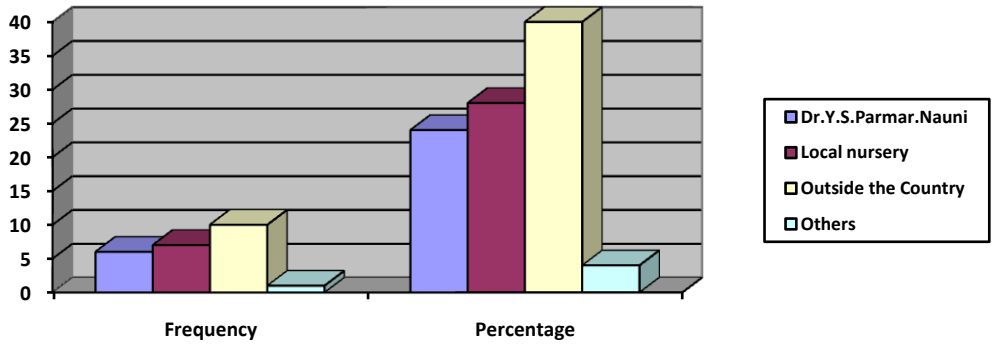


FIGURE 4.14Source of buying high-density apple plants

4.15Rootstock and seedling mostly used by farmers :

Figure 4.15shows that most of the farmers in the study area used seedling followed by the M-111, MM-9M-106, M-7 and M-26 rootstock for raising high-density apple plantation in their area.

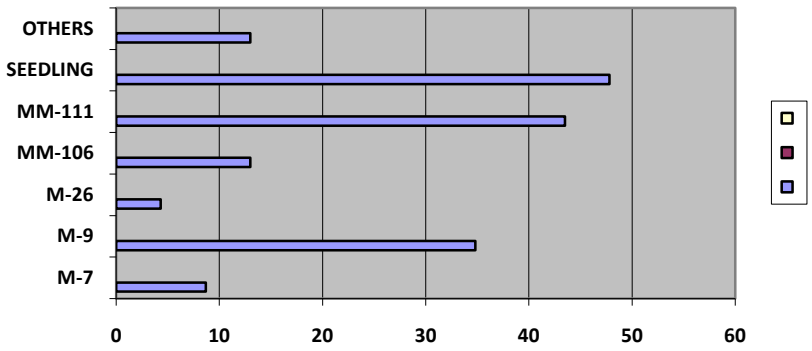


Figure 4.15 Rootstock and seedling mostly used by the farmers

4.16 P.H level of soil

Table and figure 4.16 shows the pH level of the soil in the study area. The analysis of the data shows that 8 per cent of the respondents'orchard pH level of soil was between 4-5, 16 per cent of the respondents' orchard pH level of soil was between 5-6, 36 per cent of the respondents' pH level of soil was between 6-7, 8 per cent of the respondents' pH level of soil was between 7-8 whereas 32 per cent of the respondents do not know about pHlevel of their soil.

TABLE 4.16 P.H level of soil

Level	Frequency	Percentage
4-5 level	2	8
5-6 level	4	16
6-7 level	9	36
7-8 level	2	8
Don't know	8	32
Total	25	100

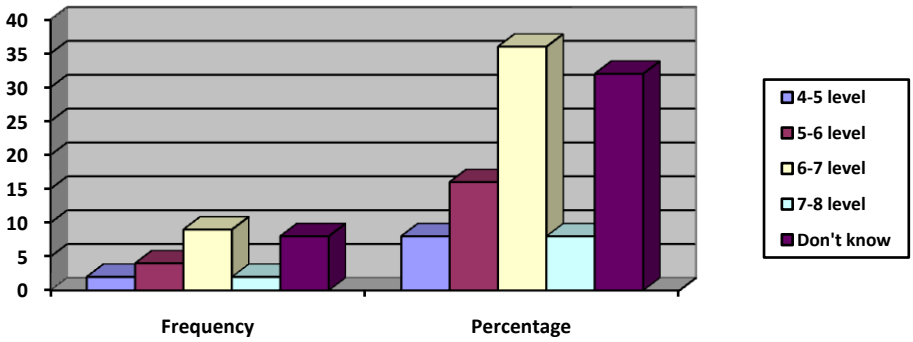


FIGURE 4.16 P.H level of soil

4.17 Annual expenses in high-density apple plantation

Table and figure 4.17 shows the classification of the respondents based onthe annual expenses incurred inhigh-density apple plantation. The analysis of the data shows that 20 per cent of the respondents hadincurred annual expenses between 10,000-25,000, 24 per cent of the respondents incurred annual expenses between 25,000-50,000, 24 per cent of the respondents incurred annual expenses between 50,000-1,00,000 and 16 per cent of the respondents had annual expenses between 1,00,000-3,00,000 and 8 per cent of the respondents had annual expenses 3,00,000and above in high-density apple plantation.

Table 4.17 Annual expenses in high-density apple plantation

Expenses	Frequency	Percentage
10,000-25,000	5	20
25,000-50,000	6	24
50,000-1,00,000	6	24
1,00,000-3,00,000	4	16
3,00,000-above	2	8
No response	2	8
Total	25	100

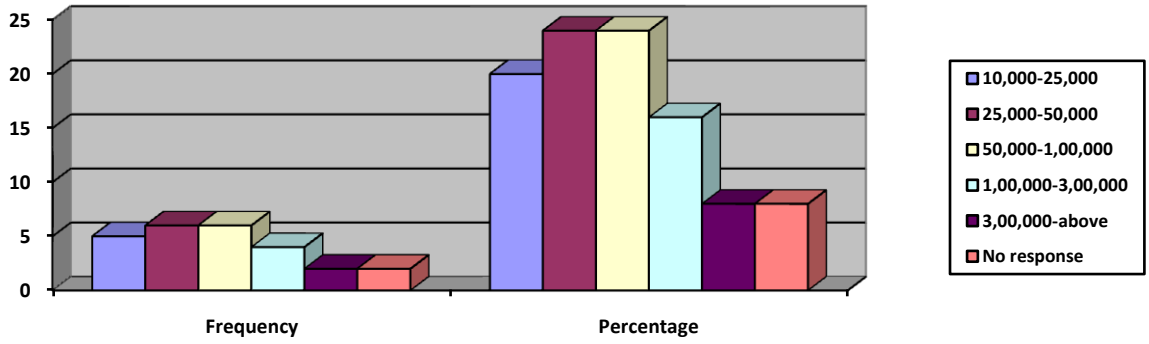


Figure 4.17 Annual expenses in high-density apple plantation

4.18Total annual income from high-density apple plantation

Table and figure 4.18shows the classification of the respondents based on total annual income generated fromhigh-density apple plantation. The analysis of the data shows that 24 per cent of the respondents' had generated annual income between 10,000-25,000, 12 per cent of the respondent's had generated annual income between 25,000-50,000, 4 per cent of the

respondents had earned annual income between 50,000-1,00,000, 40 per cent of the respondents had an annual income between 1,00,000-5,00,000 , 12 per cent of the respondents had generated annual income above 5,00,000 whereas 8 per cent of the respondents did notgive their response regarding their annual income from high-density apple plantation.

Table 4.18 Total annual income from high-density apple plantation

Income	Frequency	Percentage
10,000-25,000	6	24
25,000-50,000	3	12
50,000-1,00,000	1	4
1,00,000-5,00,000	10	40
5,00,000-above	3	12
No response	2	8
Total	25	100

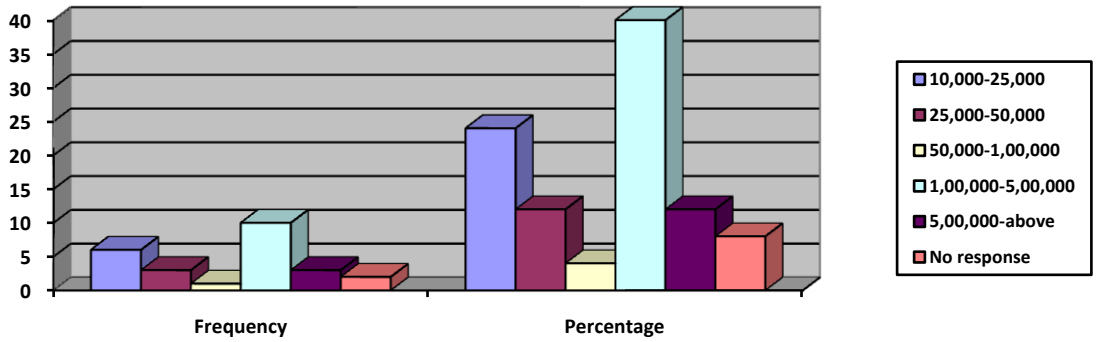


Figure 4.18Total annual income from high-density apple plantation

4.19 Follow any scientific method in high-density apple plantation which is different from traditional apple plantation :

FIGURE 4.19shows that most the farmers used pruning and training system which is the scientific method in high-density apple plantation. The analysis of data shows that 78 per cent of the respondent used pruning and training system in high-density apple plantation.

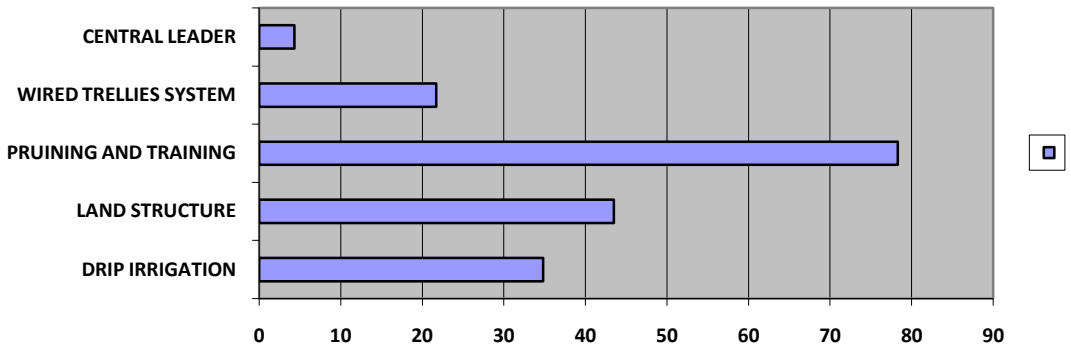


Figure 4.19Follow any scientific method in high-density apple plantation which is different from traditional apple plantation

4.20 Average age of plants

Table and figure 4.20 shows the average age-wise classification of plants under high-density apple plantation in the study area. The analysis of the data shows that 28 per cent of the respondent's plant age was between 1-5, 32 per cent of the respondent's plant age between 5-10, 12 per cent of the respondent's plant age between 10-15, 4 per cent of the respondent's plant age between 15-20 years and 20 per cent of the respondent's plant age above 20 years and 4 per cent of the respondents do not give their response regarding the age of plants.

Table 4.20 Average age of plants

Age	Frequency	Percentage
1-5 years	7	28
5-10 years	8	32
10-15 years	3	12
15-20 years	1	4
20-above years	5	20
No response	1	4
Total	25	100

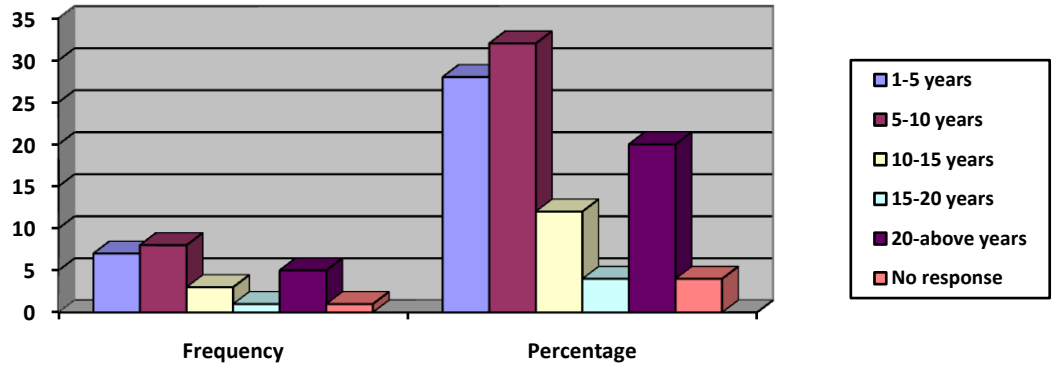


Figure 4.20 Average age of plants

4.21Number of boxes (20kg) produced annually from high-density apple plantation

Table and figure 4.21 shows the information regarding the number of boxes produced annually from high-density apple plantation. The analysis of the data shows that 48 per cent of the respondents had produced 50-100 boxes from the high-density plantation, 28 per cent of the respondents had produced boxes between 100-500, 4 per cent of the respondents had produced boxes between 500-1000, 12 per cent of the respondents had produced between 1000-2000 boxes and 8 per cent of the respondents does not give their response.

Table 4.21 Boxes (20kg) produced annually from high-density apple plantation

Boxes	Frequency	Percentage
50-100	12	48
100-500	7	28
500-1,000	1	4
1,000-2,000	3	12
No response	2	8
Total	25	100

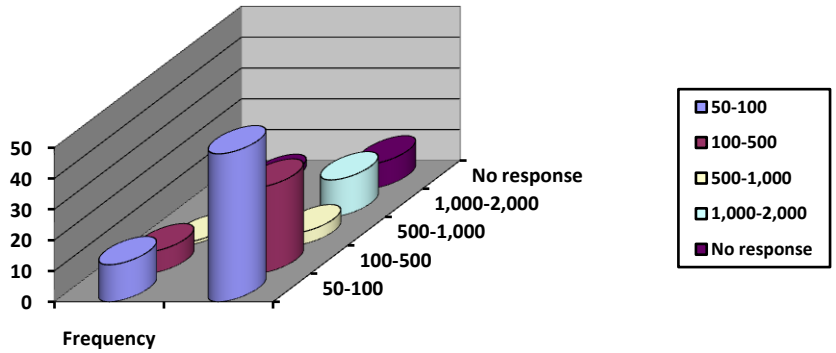


Figure 4.21 Boxes (20kg) produced annually from high-density apple plantation

4.22 Average production of apple fruits per tree under high-density apple plantation

Table and figure 4.22 shows the information regarding the average production of apple fruits per tree under high-density apple plantation. The analysis of the data shows that 40 per cent of the respondent's average production of apple fruits per tree was between 1-5kg, 32 per cent of the respondent's average production of apple fruits per tree was between 5-10 kg, 16 per cent of the respondent's average production of apple fruits per tree was between 10-15kg, 8 per cent of the respondent's average production of apple fruits per tree was between 15-20kg and 4 per cent of the respondent's average production of apple fruits per tree was between 20-50kg under high-density apple plantation.

Table 4.22Average production of apple fruits per tree under high-density apple plantation

Fruit per tree (kg)	Frequency	Percentage
1-5 kg	10	40
5-10 kg	8	32
10-15 kg	4	16
15-20 kg	2	8
20-50 kg	1	4
Total	25	100

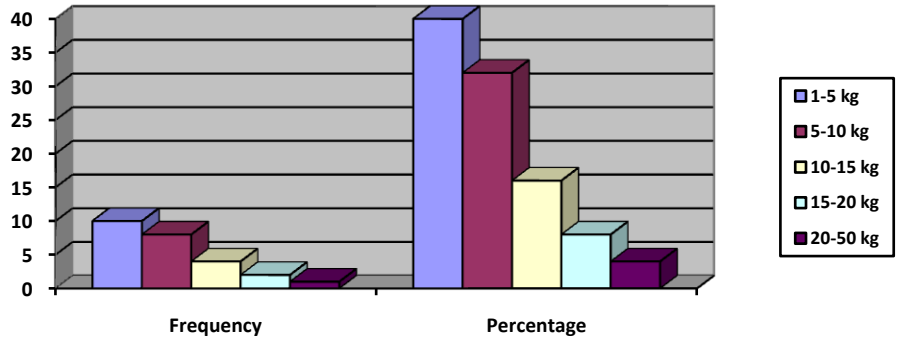


Figure 4.22 Average production of apple fruits per tree under high-density apple plantation

(C) Challenges faced by the respondents inhigh-density apple plantation

4.23External factor affecting the high-density apple farming

Table and figure 4.23 shows the information regarding the external factor affecting the high-density apple plantation in the study area. It can be concluded from the study that the unavailability of the market, lack of transportation, lack of availability of labour, delay payments and lack of fertilizers and other inputs were the major external factors affecting the high-density apple plantation in the study area.

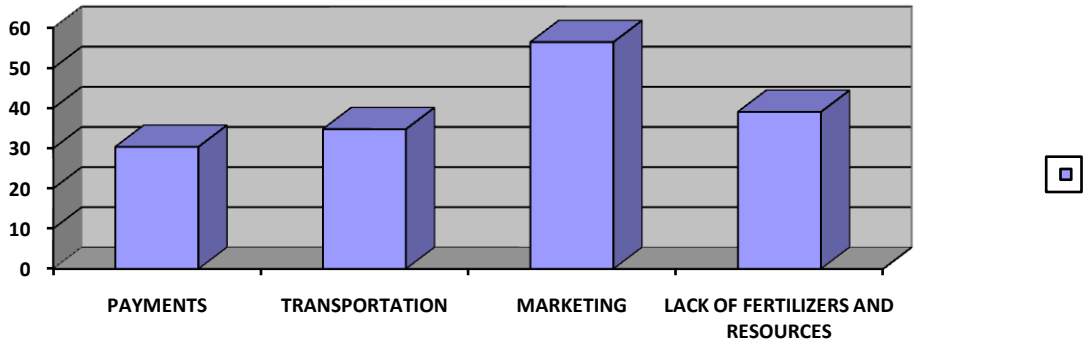


FIGURE 4.23 External factor affecting the high-density apple farming

4.24Market destination for the production of high-density apple plantation.

Table and figure 4.24 shows the information regarding the destination for the production of high-density apple plantation. The analysis of the data shows that 16 per cent of the respondents sold their produce in town, 12 per cent of the respondent's sold out their produce in cities, 56 per cent of the respondents sold their produce in mandis, 12 per cent of the

respondents sold their produce to local buyers and 4 per cent of the respondents sold their produce in other areas.

Table 4.24 Market destination for the production of high-density apple plantation.

Location	Frequency	Percentage
Town	4	16
City	3	12
Mandis	14	56
Local buyers	3	12
Others	1	4
Total	25	100

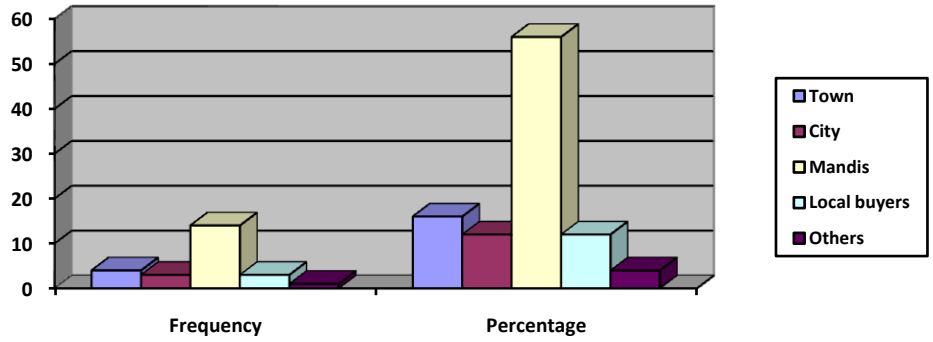


Table 4.24Market destination for the production of high-density apple plantation.

4.25 Major problem faced by the respondents during the ongoing process ofhigh-density apple farming.

Table and figure 4.25 shows the information regarding the major problem faced by the respondents during the ongoing process of high-density apple farming. The analysis of the data shows that 36 per cent of the respondents faced the major problem related to the more water requirement by the plants, 16 per cent of the respondents faced the problem regarding the management of high-density plants whereas 20 per cent of the respondents faced problems related to storage, 24 per cent of the respondentshad faced the problems related to the availability of labour, and rest 4 per cent of the respondents faced others problems.

Table 4.25Major problem faced by the respondents during the ongoing process of high-density apple farming

Problems	Frequency	Percentage
Water	9	36
Management	4	16
Storage	5	20
Labour	6	24
Others	1	4
Total	25	100

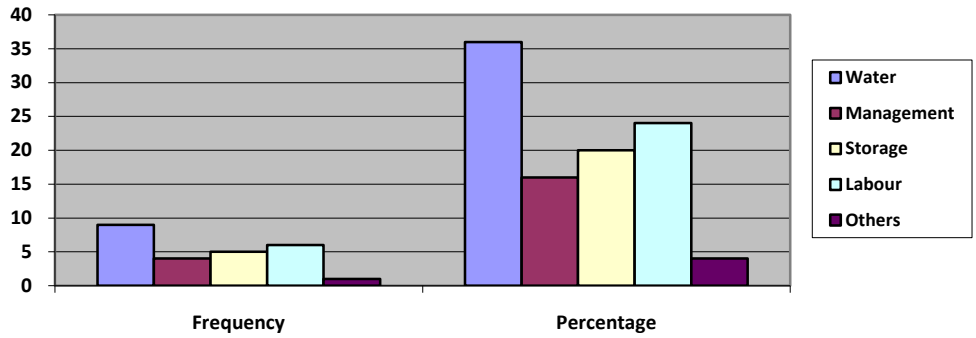


Figure 4.25Major problem faced by the respondents during the ongoing process of high-density apple farming

4.26 Attended any Seminar, event organised by the government

Table and figure 4.26 shows the information whether the respondent attended any seminar, events or training related to high-density plantation organised by the government or any other organization. The data shows that 60 per cent farmers had not attended any training, events and seminar on high-density plantation whether 40 per cent respondents said that they had attended training on the high-density plantation.

Table 4.26Attended any seminar, event organised by the government

Particular	Frequency	Percentage
Yes	10	40
No	15	60
Total	25	100

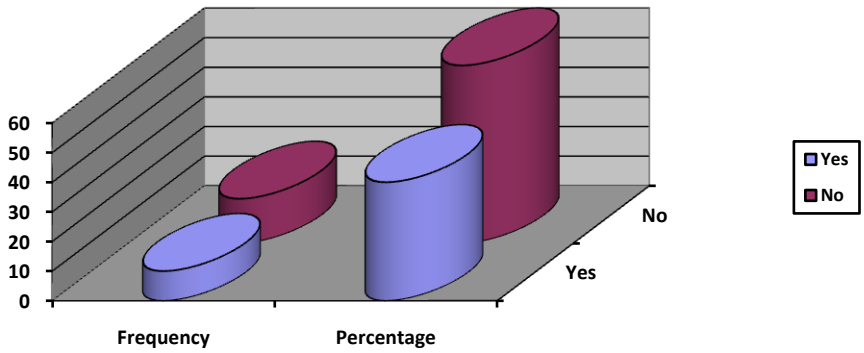


Figure 4.26 Attended any seminar, event organised by the government

CHAPTER -5

SUMMARY AND CONCLUSIONS

The present study wasconducted on “Perception and challenges of farmer’s for high-density apple plantation in the district Shimla of Himachal Pradesh ”. The main objective of the research was to study the perceptions of people towards high-density apple plantation and to know about challenges faced by farmers in high-density apple plantationin the Shimla district of Himachal Pradesh. The study was conducted with a sample size of 25 respondents in the study area, in which all the respondents wereapple growers who work only on high-density apple plantation. Data wereanalyzed by applying the percentage method. The finding and conclusion of the study are discussed below:

Farmer’s perception towards high-density apple plantation in Shimla district of Himachal Pradesh :

1) It was evident from the study that 96 per cent of respondents were male and 4 per cent were female.
2) The findings of the study show that 52 per cent of the respondents belong to the age group between 20 -30 years that means most of the respondents were young.
3) The results of the study show that 36 per cent of the respondents who were involved in high-density plantation belongsto theRohrutehsil.
4) The data shows that 52 per cent of the respondents were graduated which means most of the farmers in the study area wereeducated.
5) The findings of the study show that most of the respondentsie. 60 per cent had 5-10 years experience in the high-density plantation.
6) It was found in the study that 40 per cent of the respondents' orchards were located at both sunny and shaded side and 32 per cent of the respondents'geographical site of the orchard was sunny side.
7) The study shows that most of the farmers producing Red Velox, Jeromine and Royal Delicious varieties in their high-density apple plantation.
8) The data shows that 16 per cent each other variety grown by farmers in high-density apple plantation is Gale Gala, King Rot and Granny smith which is the most variety grown by farmers.
9) It was reported in the study that 36 per cent of the respondents'orchard elevation was between the 6000-7000ft.

10) The findings of the study showed that almost 68 per cent of the respondents had 1-5 bighas land under high-density apple plantation, 12 per cent of the respondents had 5-20 bighas land and 8 per cent of the respondents had planted high-density apple plantation under 20-30 bighas land.

Challenges faced by farmer's in high-density apple plantation:

1) It can be concluded from the study that the unavailability of the market, lack of transportation, lack of availability of labour, delay payments and lack of fertilizers and other inputs were the major external factors affecting the high-density apple plantation in the study area.
2) The findings of the study show that 16 per cent of the respondents sold their produce in town, 12 per cent of the respondent's sold out their produce in cities, 56 per cent of the respondents sold their produce in mandis, 12 per cent of the respondents sold their produce to local buyers and 4 per cent of the respondents sold their produce in other areas.
3) The results of the study show that 36 per cent of the respondents faced the major problem related to the more water requirement by the plants, 16 per cent of the respondents faced the problem regarding the management of high-density plants whereas 20 per cent of the respondents faced problems related to storage, 24 per cent of the respondents had faced the problems related to the availability of labour, and rest 4 per cent of the respondents faced others problems
4) The study shows that most of the farmers were less aware of the concept of high-density apple plantation which can improve their production, income and minimize the cost. Moreover,60 per cent of the respondents said that they had never attended any seminar, events and any training from government or any other organization where they can gain information onhigh-density apple plantation.

SUGGESTIONS

The overall findings of the study show that people are less aware of the concept of high-density apple plantation. The concept of high-density plantation came from the countries which are producing apple on rootstock and have proper infrastructure for high-density apple farming. But in Himachal Pradesh, it is a new concept and scientists, horticulture departmentconducting trials on it. Moreover, there are few varieties and rootstock which are accepted by the department of horticulture of Himachal Pradesh for high-density plantation.

However, the study resulted that there were many challenges in high-density apple plantation like, selection of right variety, selection of right rootstock, proper land structure, compulsory instruments like trellies system, pruning and training is different as compared to traditional plants etc. It is required that government or institutions provide proper knowledge to people by organizing awareness campaigns, events etc. on high-density apple plantation.Further, it is suggested that a shift towards non-food crops (principally cash crops) and high-density plantations will better take advantage of the geography and climate of the valley and a viable option and should be encouraged.

CONCLUSION

The present study was an attempt to study the perception and challenges of farmers for high-density apple plantation in Shimla district of Himachal Pradesh. The analysis of data shows that the future of high-density apple plantation in Himachal Pradesh is bright and many younger farmers moving towards high-density plantation because it is easy to manage plants of the small sizes as compared to traditional plants. However, farmers faced many problems in the selection of right variety and rootstock based on elevation height of orchard, weather, climate, the pH level of soil, land structure, soil type etc. It is not an easy concept for every farmer as high-density apple plantation is different from traditional apple plantation. So before investing in high-density apple plantation, farmers need to have proper knowledge regarding high-density plantation.

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Title of the Project	:	**"Farmer's Perception for High Density Apple Plantation in District Shimla of Himachal Pradesh"**
Name of the Student	:	Neeraj Mehta
Admission Number	:	H-2018-15-MBA
Major Discipline	:	Finance
Minor Discipline	:	Marketing
Date of Project Submission	:	31.8.2020
Total Pages in Report	:	41+vii
Major Advisor	:	Dr RashmiChaudhary

ABSTRACT

The present study was an attempt to study the perception and challenges of farmers for high-density apple plantation in Shimla district of Himachal Pradesh. The study reported that high-density varieties of rootstock plantation have been adopted by generally, progressive and large growers and very popular in lower heights in the state. Thus, such plantation is not concentrated in one area/pocket and mostly these rootstocks were used as filler in standard varieties of apple. The large growers are uprooting their standard variety apple orchards and practicing semi, high-density apple plantation It was found that there were positive as well as negative effects of High Density Apple farming in Himachal Pradesh because there are several challenges as compare to traditional farming. The analysis of data shows that the future of high-density apple plantation in Himachal Pradesh is bright and many younger farmers moving towards high-density plantation because it is easy to manage plants of the small sizes as compared to traditional plants. However, farmers faced many problems in the selection of right variety and rootstock based on elevation height of orchard, weather, climate, the pH level of soil, land structure, soil type etc.

Neeraj Mehta DrRashmiChaudhary

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Appendix -1

Questionnaire on "Perception and Challenges of farmers for High Density Apple Plantation in District Shimla of Himachal Pradesh "

Dear Respondent

I am NEERAJ MEHTA, pursuing MBA from Dr. Y.S. Parmar University of Horticulture and Forestry Nauni, Solan (H.P). I request you to kindly spend some time in filling this questionnaire to help me complete my project on " Perception and Challenges of farmers for High Density Apple Plantation in District Shimla of Himachal Pradesh ".

1. Name

_____

2. Gender

   Male ☐

   Female ☐

3. District

_____

4. Village Name

_____

5. Tehsil Name

_____

6. Education Qualification

☐ Up to High School

☐ Senior Secondary School

☐ Graduation

☐ Post Graduation

7. Age

_____

8. Number of years in High Density Apple farming

10-15 ☐ 5-10 ☐

10-15 ☐ 15-20 ☐ 20 above ☐

9. What is the geographical site of the orchard ?

Sunny Side ☐ Shased Side ☐

10. What kind of Apple New Delicious Variety You produce in High Density Plantation?

Red velox ☐ Royal Delicious ☐ Gale Gala ☐

Jeromine ☐ Others ☐

11. Any another Apple variety you grow in High Density Plantation?

_____

12. What kind of New Apple Spur Variety you produce in H.D.P.?

Oregone spur ☐ Ace spur ☐

Granny smith ☐ Other ☐

13. What kind of another apple pollination variety you used.

_____

14. What is the elevation height of your orchard.

2000-4000ft ☐ 4000-5000ft ☐

5000-6000ft ☐ 6000-7000ft ☐

7000-aboveft ☐

15. How many plants have you planted in your orchard in High Density Apple Plantation?

100-500 ☐ 500-1000 ☐ 1000-2000 ☐

2000-5000 ☐ 5000-above ☐

16. How much land used for cultivating High Density Apple Plantation.(bighas , biswa , square feet.

17. How many plants planted in rootstock?

Rootstock	0-100.	100-200	200-500	500-1,000	1,000-above
M-7	☐	☐	☐	☐	☐
M-9	☐	☐	☐	☐	☐
M-26	☐	☐	☐	☐	☐
MM-106	☐	☐	☐	☐	☐
MM-111	☐	☐	☐	☐	☐
Seedling	☐	☐	☐	☐	☐

18. Where you buy the Apple Plants

Dr.Y.S.ParmarNauni ☐ Local Nursery ☐

Outside The country ☐ Other ☐

19. Which rootstock and seedling is mostly used by you

M-7 ☐ M-26 ☐ M-9 ☐

MM-106 ☐ MM-111 ☐ Seeding ☐

Others ☐

20. What is the P/H level of Soil?

_____

21. What are your annual Expenses of producing Apple in High Density Plantation .

10,000-25,000 ☐ 25,000-50000 ☐ 50000-10000 ☐

100000-300000 ☐ Above 300000 ☐

22. What is Total Annual Income of producing Apple in High Density plantation.

10,000-25,000 ☐ 25,000-50000 ☐ 50000-10000 ☐

100000-500000 ☐ Above 500000 ☐

23. Which apple variety is mostly produce and in which rootstock.

	M-7	M-9	M-26	MM-106	M M-111	Seedling	Others
Red velox	☐	☐	☐	☐	☐	☐	☐
Royal Delicious	☐	☐	☐	☐	☐	☐	☐
Gale Gala	☐	☐	☐	☐	☐	☐	☐
Jeromine	☐	☐	☐	☐	☐	☐	☐
Granny smith	☐	☐	☐	☐	☐	☐	☐
King Rot	☐	☐	☐	☐	☐	☐	☐
Oregone spur	☐	☐	☐	☐	☐	☐	☐
Super chief	☐	☐	☐	☐	☐	☐	☐
Ace spur	☐	☐	☐	☐	☐	☐	☐
Adams	☐	☐	☐	☐	☐	☐	☐

24. Do you follow any scientific method in High Density Apple which is different to Traditional Apple Production method ?

Drip Irrigation ☐ Land Structure ☐

Prunning&Training ☐ Wired Trelly System ☐

Other: _____

25. What is the Average Age of all plants (years)

1-5 ☐ 5-10 ☐ 10-15 ☐

15-20 ☐ 20 above ☐

26. How much boxes (20kg) produced anually from High Density Apple Plantation.

50-100 ☐ 100-500 ☐ 500-1000 ☐

Above 1000 ☐

27. What is the average production of apple fruit per tree in (kg)

_____

28. What is external factor mostly affect you ?

Payment ☐ Transportation ☐ Marketing ☐

Availability of resources fertilizers, spray oils, other instruments etc. ☐

29. Where do you sell your High Density Apple Fruit

City ☐ Town ☐ Mandi ☐

Local Buyers ☐ Others ☐

30. Major problem faced by you in on -going process

Water ☐ Management ☐ Storage ☐

Labour ☐ Others ☐

31. High Density Plantation of Apple in Rootstock is better than Seedling .

Strongly disagree ☐ Disagree ☐ Neutral ☐

Agree ☐ Strongly Agree ☐

32. Did you attend any seminar ,events ,which is authorized by goverment or any non goverment organization.

Yes ☐ No ☐

33. What is your Perception about High Density Plantation of Apple in Shimla District?

_____

_____

_____

_____

_____

Brief Bio Data of the Student

Student Name : NEERAJ MEHTA

Father's Name :MR. SATISH MEHTA

Mother's Name : MRS. ANJU MEHTA

Date of Birth: 06/JUNE/1996

Permanent Address: VILLAGE:KHANETI , P.O.: BATARI , TEHSIL:KUMARSAIN , DISTRICT : SHIMLA (H.P.) , PIN CODE : 172031.

Academic Qualities

	Month and year	**School**	**Board/University**	**Marks (%)**	**Division**
10th Class	**March/2012**	**Gorton Mission School Kotgarh**	**ICSE**	**54**	**B**
12th Class	**March/2014**	**Gorton Mission School Shimla**	**ISE**	**57**	**A**
B.COM	**July/2017**	**Goverment Degree College Kumarsain**	**H.P.**	**78**	**A**

Internship Qualities

Summer Internship of 45 days on “ANALYSIS OF FINANCIAL STATEMENTS” at Baghat Urban Cooperative Bank, Solan.

Project Report on "Perception and Challenges of farmers for High Density Apple Plantation in District Shimla of Himachal Pradesh”

Personal Qualities

Quick learner, Smart and hardwork, Motivational skill, Communication skill

Interested in All Activities

Languages known: English and Hindi

Hobbies: Travelling , Listening Music , Cricket, Soccer , Snooker, Photography .

Declaration: I NeerajMehta ,here by declare that the above information provided by me is true as per my knowledge and I will be held responsible for any discrepancies.

Neeraj Mehta