Benchmark Survey of Horticulture Crops in Uttar Pradesh
Area and Production Estimation

REPORT

Sponsored by:

Directorate of Economics and Statistics, Department of Planning,
Government of Uttar Pradesh

Submitted by:

Nomita P. Kumar
&
Kavita Baliyan

GIRI INSTITUTE OF DEVELOPMENT STUDIES
(An Autonomous Institute Funded by ICSSR and Govt. Of UttarPradesh)
Sector - O, Aliganj Housing Scheme
LUCKNOW - 226024, U.P.
INDIA

April 2020

PREFACE

Horticulture is an important component of agriculture having significant role in the economy of the country. India's varied agro-climatic conditions provides an additional advantage in favour of growing of a wide variety of horticultural crops such as fruits & vegetables, tuber crops, plantation crops, flowers, spices & condiments etc. Commercial importance of horticulture crops has also been increasing gaining all over the world as these crops contribute significantly to the country's economy. Various horticulture crops also play an important role in human nutrition, preventing diseases and contributing to the nation's development and prosperity. In particular, the horticulture crops such as fruits and vegetables are rich source of vitamins, minerals, proteins and carbohydrates that are essential in human diet. Similarly, other crops like flowers and ornamental crops enhance aesthetic value of our environment while medicinal crops yield pharmaceutical constituents. Thus, horticulture assumes a great importance in food and nutritional security, general health and well -being of our population. Horticulture crops form a vital part in the Indian agricultural production. India is the second largest producer of fruits and vegetables in the world. Cultivation, marketing and processing of these crops generate significant employment and livelihood opportunities in many parts of the country.

India is the second largest producer of fruits as well as vegetables after China. The country ranks first in the world in the production of mango, banana, sapota and acid lime. Over the years, the country has achieved highest productivity in grapes as well. Still, the country has huge untapped potential to improve the productivity and production of fruits, vegetables and flowers with the help of already available technological advancement in the field of agriculture. The importance of the expansion of horticulture has been increased substantially owing to its vast export potential in the WTO regime.

In detail, the present study has attempted to examine the implementation pattern, status of completion and kinds of deficiencies and gaps emerging in case of Uttar Pradesh, where horticulture is one of the critical sectors in the economy. The horticulture crops are grown in around 30 lakh hectares area which accounts 12 precent of the total cultivated area of the State (State Horticultural Mission Report, 2013). Expansion of area horticulture can promote economic diversification and thus create additional employment opportunities in the state.

The area under horticulture crops can be increased by utilization of available cultivable wastelands, fallow lands and the land belonging to non-resident landowners in villages. Horticulture crops cover a wide variety of fruits, vegetables, tuber crops, mushrooms, floriculture, medicinal and aromatic plants, spices, food processing and bee keeping. U.P.'s varied agro-climate permits growing of a large number of these crops throughout the year enabling their availability on a regular basis. The state holds a vast potential for the development of various horticulture crops as it has diver's climatic conditions for growing different categories of fruits and off -season vegetables in its different agro zones. Therefore, horticulture has emerged as one of the major agricultural activities as there has been a substantial increase in both area and production of horticulture crops. As has been well recognised that the horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas. Fruits and vegetables have been shown to earn 20-30 times more foreign exchange per unit area than cereals due to higher yields and higher prices available in the national/international markets. Primary survey provides us insight into problems experienced in different stages of the plantation of horticulture crops.

However, a little initiative has been undertaken in favor of promoting horticulture sector despite various agro climatic regions have been possessing certain area specific advantages for growing different horticultural crops during different agricultural seasons over the years. Non availability of accurate data and other information on the status and pattern of growing different fruits, vegetables and other horticulture crops at district, regional and agro zone levels has generally been cited as the main constraints by planners and policy makers for planning development of horticulture in the state. Keeping into account these facts into consideration the present study to propose for carrying out a detail study on issues related to the present status of horticulture sector across the districts and agro- zones of the state.

The main objectives with which this study was conducted was: firstly, to estimate land use pattern under various agriculture and horticultural crops and its changing pattern across different geographical and agro- climatic conditions and at state level; secondly, pattern and emerging changes in productivity/yield rates of different agriculture and horticultural crops; thirdly, pattern and emerging changes in output of different agriculture and horticultural crops; fourthly, input use, cost of production, profitability of using land under different options and factors implicating variations in opting cultivation of different horticulture and other crops across the regions of the state; fifthly, area specific emerging constraints in opting cultivation of different horticulture crops and measures to be initiated to overcome from these

constraints; sixthly, contribution of horticulture to GDP at district, region and state level; seventhly, to suggest about the types of measures to be initiated for maximizing land under the cultivation of horticulture crops and finally recommends about the kinds of measures to be initiated for achieving more successful results from the implementation of such package in context of horticulture crops in the future.

The authors are grateful to the Directorate of Economics and Statistics, Department of Planning, Government of Uttar Pradesh for providing financial support to undertake this study "**Survey for estimation of area and production of selected vegetable/ floriculture crops in State- a limited survey will be undertaken to assess area and production of select flower/ vegetable crops and emerging crop like mushroom production**" which was later titled as '***Benchmark Survey of Horticulture Crops in Uttar Pradesh: Area and Production Estimation***". We wish to record our sincere thanks to Mr, A. K. Pandey, Director, Department of Economic and Statistics, Government of Uttar Pradesh for asking us to conduct such an important study and providing valuable support in conducting this study. Sincere thanks are also due to the officials of different line departments of State Government who are responsible for successful implementation of this study and provided necessary data and other inputs as required by us.

We would also like to extend gratitude to our Director, Prof B. K. Bajpai for extending every possible support to us at various stages of the project. We are thankful to all the support obtained by administrative and library staff for extending the required support. We also wish to thank our research team comprising Mr. Bindra Prasad, Mr Iltafat Khan, Mr. Nitin Mishra and Mr Dinesh Kumar for their valuable assistance in collection of data from different sources/ districts. Thanks are due to Dr Sandeep Kumar Baliyan, Consultant for doing the tedious job of analysis of primary and secondary data. We are indebted to Dr Achala Srivastava, Senior Research Associate and Dr Swapnil Gupta, Senior Research Assistant, for helping in preparing this draft report and Mr. Nishchal Singh Bisht, Research Investigator for continuous help in data feeding and its analysis. We are also thankful to all the respondents from nine districts covered in our study without whose support we could not have been able to complete this study.

April, 2020

Nomita P. Kumar
Kavita Baliyan
Project Director

CONTENT

List of Tables

List of Figures

CHAPTER I

Introduction and Research Methodology

I: Background

Horticulture is an important component of agriculture having significant role in the economy of the country. India's varied agro-climatic conditions provides an additional advantage in favor of growing of a wide variety of horticultural crops such as fruits & vegetables, tuber crops, plantation crops, flowers, spices & condiments etc. Commercial importance of horticulture crops has also been increasing and gaining grounds all over the world as these crops contribute significantly to the country's economy. Various horticulture crops also play an important role in human nutrition, preventing diseases and contributing to the nation's development and prosperity. In particular, the horticulture crops such as fruits and vegetables are rich source of vitamins, minerals, proteins and carbohydrates that are essential in human diet. Similarly, other crops like flowers and ornamental crops enhance aesthetic value of our environment while medicinal crops yield pharmaceutical constituents. Thus, horticulture assumes a great importance in food and nutritional security, general health and well -being of our population. Horticulture crops form a vital part in the Indian agricultural production. India is the second largest producer of fruits and vegetables in the world. Cultivation, marketing and processing of these crops generate significant employment and livelihood opportunities in many part of the country.

India is the second largest producer of fruits as well as vegetables after China. The country ranks first in the world in the production of mango, banana, sapota and acid lime. Over the years, the country has achieved highest productivity in grapes as well. Still, the country has huge untapped potential to improve upon the productivity and production of fruits, vegetables and flowers with the help of already available technological advancement in the field of agriculture. The importance of the expansion of horticulture has been increased substantially owing to its vast export potential in the WTO regime.

II: Significance of Promoting Horticulture Cultivation

Growing horticultural crops can provide gainful employment to a larger majority of the farmers and agricultural labor throughout the year. Since, it has been estimated that one hectare of fruit production generates 860 man-days per annum as against 143 man-days for

cereal crops. Some industrial attribute crops and cultural intensive crops like grapes, banana and pineapple, generate much larger employment ranging from 1,000 to 2,500 man-days per hectare per annum (**M. Gogoi& D. Borah, 2013)**.

Indian agriculture is dominated by small and marginal farmers. According to the ***Agricultural Census,* 2001**, 81.9 per cent of holdings were less than or equal to 2 ha and had an average size of 0.59 ha. Although, horticulture has potential of higher returns from land, it is often debated that farmers cultivating tiny pieces of land may not diversify towards these crops due to numerous constraints in production and marketing as well as price risks associated with these crops. Among horticultural crops, vegetables are more pronounced on small farms, while fruits and spices occupy a larger share on large farms. Such differences are inevitable. Vegetables generate quick returns, require low capital and relatively higher labour input, which matches resource endowments of the small farmers. Since fruits and spices require higher initial capital and have a long gestation period, these do not suit to small farmers who are capital constrained. Therefore, small farmers generally diversify towards vegetables because of surplus labor and liquidity constraint (**Birthal*et al*., 2008**).

In a study on **'*prospects of horticulture in India'*,** Surabhi Mittal (2007) found that in spite of being one of the largest producers of fruits and vegetables in the world, the export competitiveness among the Indian producers remains low. Her study has observed a shift in cropping pattern in favor of horticulture in India in the past one-and-a-half decades as a result of diversification in consumption pattern from cereals to high-value agricultural produce. There is an overall increase in the demand for fruits and vegetables for consumption both in the fresh and the processed form. Also there is a wide diversification in production pattern globally. Income in this sector is increasing which is indeed driving the supply. Hence, by keeping a check on the supply constraints, yield gaps and huge logistic costs along with targeting the potential states for the fruits and vegetables, the export potential of the country can be enhanced. With new marketing initiatives, the post-harvest losses and the wastage due to poor infrastructure facilities, such as storage and transportation, have been reduced to considerable extent.

Joshi P.K., Joshi Laxmi, Birthal Pratap S (2006) assessed the impact of diversification of agriculture towards vegetables on farm income and employment and found that vegetable production is more profitable and labor-intensive. It also augments income of smallholders

and generates employment opportunities in rural areas especially for women. But, there are major constraints as well, like lack of assured markets and a well-developed seed sector; lack of efficient marketing system & lack of appropriate infrastructure causes huge post-harvest losses. To check these constraints, contract farming is suggested.

It is contended that viability of small farms can be improved through diversification of agriculture into higher-value crops like fruits and vegetables. However, there are some challenges like access to land and resources, maintaining the cold chain, & market development viz. a viz. bureaucracy and transaction costs. The relative prices of cereal crops such as rice and wheat have decreased over recent decades, eroding their farming profitability. The on-going 'No-till or Reduced-till Revolution', a silent multi-stakeholders' movement funded primarily through private investments and driven by an urge to produce more food at less cost, conserve land and water resources and improve environmental quality, is benefiting all farmers & civil society and enhancing the prospects for diversification/expanding horticulture and its gains to both growers and consumers (**M.L.Jat, & at.al. 2006)**. For estimating the growth, for carrying out analysis to assess the demand and supply trend, to identify problems and constraints, for evolving adaptive policies and exploring growth prospects, **a**vailability of district/cluster/component wise data reliable & detailed data is crucial (**Gogoi** & **Borah 2013)**. For this purpose, the farmers/ Panchayat members should be involved to get better & accurate results. Further, there should be a nodal agency in every state to handle all kinds of data generated by different agencies/Departments. Also, there should be a Data Consortium as well with representation from all concerned formed by a group of technical experts.

III: Horticulture in Uttar Pradesh

In case of Uttar Pradesh, horticulture is one of the critical sectors in the economy. The horticulture crops are grown in around 30 lakh hectares area which accounts 12 present of the total cultivated area of the State (State Horticultural Mission Report, 2013). Expansion of area horticulture can promote economic diversification and thus create additional employment opportunities in the state. The area under horticulture crops can be increased by utilization of available cultivable wastelands, fallow lands and the land belonging to non-resident landowners in villages. Horticulture crops cover a wide variety of fruits, vegetables, tuber crops, mushrooms, floriculture, medicinal and aromatic plants, spices, food processing

and bee keeping. U.P. is being covered by 9 agro climatic zones mainly, Bhabar and terai, Bundelkhand, central, Eastern plain, Mid western plain, North Eastern plain, South west semi arid, Vindhya, Western plain. U.P.'s varied agro-climate permits growing of a large number of these crops throughout the year enabling their availability on a regular basis. The state holds a vast potential for the development of various horticulture crops as it has diver's climatic conditions for growing different categories of fruits and off season vegetables in its different agro zones. Therefore, horticulture has emerged as one of the major agricultural activities as there has been a substantial increase in both area and production of horticulture crops. As, it has been well recognised that the horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas. Fruits and vegetables have been shown to earn 20-30 times more foreign exchange per unit area than cereals due to higher yields and higher prices available in the national/international markets.

IV: Main Horticulture crops in Uttar Pradesh

Following are the main horticulture crops grown in different parts of the state:

Fruits	Mango, Guava, Litchi, Amla, Banana, Bael, Ber, Citrus
Vegetables	Potato, Peas, Onion, Brinjal, Cucumber, Parwal, Tomato, Okra, Cauliflower, Cabbage, Lobia& other cucurbits.
Spices	Garlic, Chillies, Ginger, Turmeric, Coriander.
Floriculture	Rose, Tuberose, Gladiolus, Marigold, Jasmine
Medicinal / aromatic plants	Mentha, Aloevera, Ashwagandha, Tulsi,Sarpgandha& Damask rose, etc.
Others	Betel vine, Mushroom, Honey production

However, a little initiative have been undertaken in favour of promoting horticulture sector despite various agro climatic regions have been possessing certain area specific advantages for growing different horticultural crops during different agricultural seasons over the years. Non availability of accurate data and other information on the status and pattern of growing different fruits, vegetables and other horticulture crops at district, regional and agro zone levels has generally been cited as the main constraints by planners and policy makers for planning development of horticulture in the state. Keeping into account these facts into

consideration the present study to propose for carrying out a detail study on issues related to the present status of horticulture sector across the districts and agro- zones of the state and its area and production.

V: Objectives of the Study

In detail, the main objectives of the present study are as follows:

1. To estimate land use pattern under various agriculture and horticultural crops and its changing pattern across different geographical and agro- climatic conditions and at state level.

2. Pattern and emerging changes in productivity/yield rates of different agriculture and horticultural crops.

3. Pattern and emerging changes in output of different agriculture and horticultural crops.

4. Input use, cost of production, profitability of using land under different options and factors implicating variations in opting cultivation of different horticulture and other crops across the regions of the state.

5. Area specific emerging constraints in opting cultivation of different horticulture crops and measures to be initiated to overcome from these constraints.

6. Contribution of horticulture to GDP at district, region and state level.

7. To suggest about the types of measures to be initiated for maximizing land under the cultivation of horticulture crops**.**

VI: Importance of the Study

This research study was helpful in understanding the economic conditions of horticulture growers and the constraints faced by them in production, marketing and export of their produce. The study also brought out the impact and limitations of government policy to promote diversification and export of horticultural crops. It also gave policy suggestions for promoting horticulture crops in the different agro-climatic zone of the state. Thus, the study is an contribution both from methodological and policy viewpoints.

VII: Research Methodology

The study was confined to state of Uttar Pradesh. Both secondary and primary data were collected to achieve the objective specified above. The already collected secondary data such as area, production and yield of some of horticultural crops grown in Uttar Pradesh has been obtained from the Directorate of Horticulture, Directorate of Agriculture, Uttar Pradesh and other secondary sources. Data related to land use statistics is collected from the Directorate of Economics and Statistics, Uttar Pradesh. General information on selected districts and other aspects has been obtained from various issues of the Statistical Diary, Statistical Abstract of Uttar Pradesh published by the Directorate of Economics and Statistics of the state.

In addition to farmers' survey, we did visit all the district horticulture department in the selected districts. Interviews were held with the District horticulture officers (DHO) and other members of the horticulture department to understand their problems as well as problems of the farmers. After collecting information from the secondary sources, all the farmers growing horticultural crops in selected villages were canvassed a household level schedule to collect detailed information about the various aspects related to the horticultural crops grown by them.

The scope of the study was confined to growing of fruits, vegetables, spices, flowers and Medicinal / aromatic plants though it was proposed to cover mushrooms growers as well but our survey team could not found farmers growing mushrooms for commercial purposes. The study proposed to select one district from each agro-climatic zone on the basis of highest area under horticulture crops for field survey. Thereafter, two or three blocks, with the consultation of District Horticulture officer (DHO) to cover the different horticulture crops i.e. vegetables, fruits, flower and spices grown in the area has been selected from each district. Further, with the consultation of DHO, four villages from the selected blocks based on the same criteria have been chosen for detail study. Finally, 25 households from each village were selected on the basis of growing different horticulture crops in different size of land holdings for field survey. Thus, our total sample was 9 districts, 22 blocks, 36 villages and 900 households.

Table 1.1: Districts in the Agro Climatic Zones of Uttar Pradesh

Name of Zones	No of Districts	Zone-wise Name of Districts	Survey Districts
Zone -1 **Bhabhar and Tarai**	4	Bijnor, Moradabad, Pilibhit and **Rampur**	Rampur
Zone-2 **Bundelkhand**	7	Banda, Chitrakoot, Hamirpur, **Jalaun**, Jhansi, Lalitpur and Mahoba	Jalaun
Zone-3 **Central Zone**	17	Allahabad, Amethi, Auraiya, Etawah, Farrukhabad, Fatehpur, Hardoi, **Kannauj**, Kanpur Dehat, Kanpur Nagar, Kaushambi, Kheri, Lucknow, Pratapgarh, Rae Bareli, Sitapur and Unnao	Kannauj
Zone-4 **Eastern Plain**	11	Ambedkar Nagar, Azamgarh, Ballia, Barabanki, Chandauli, Faizabad, Ghazipur, Jaunpur, Mau, **Sultanpur** and Varanasi	Sultanpur
Zone-5 **Mid-Westren Plain**	5	**Amroha**, Bareilly, Budaun, Sambhal, Shahjahanpur	Amroha
Zone-6 **North-Eastren Plain**	11	Bahraich, Balrampur, Basti, Deoria, Gonda, **Gorakhpur**,Kushi Nagar, Maharajganj, Sant Kabeer Nagar, Shravasti and Siddharth Nagar	Gorakhpur
Zone-7 **South-West Semi Arid**	8	Agra, Aligarh, Etah, Firozabad, **Hathras**, Kasganj, Mainpuri and Mathura	Hathras
Zone-8 **Vindhya Area**	3	**Mirzapur**, Sant Ravidas Nagar and Sonbhadra	Mirzapur
Zone-9 **Westren Plain**	9	Baghpat, Bulandshahr, Gautam Buddha Nagar, Ghaziabad, Hapur, Meerut, Muzaffarnagar, **Saharanpur** and Shamli	Saharanpur
	75		**9**

Note: Highlighted areas are selected on basis of highest area under horticulture crops.

Map 1: Uttar Pradesh Showing Selected Districts

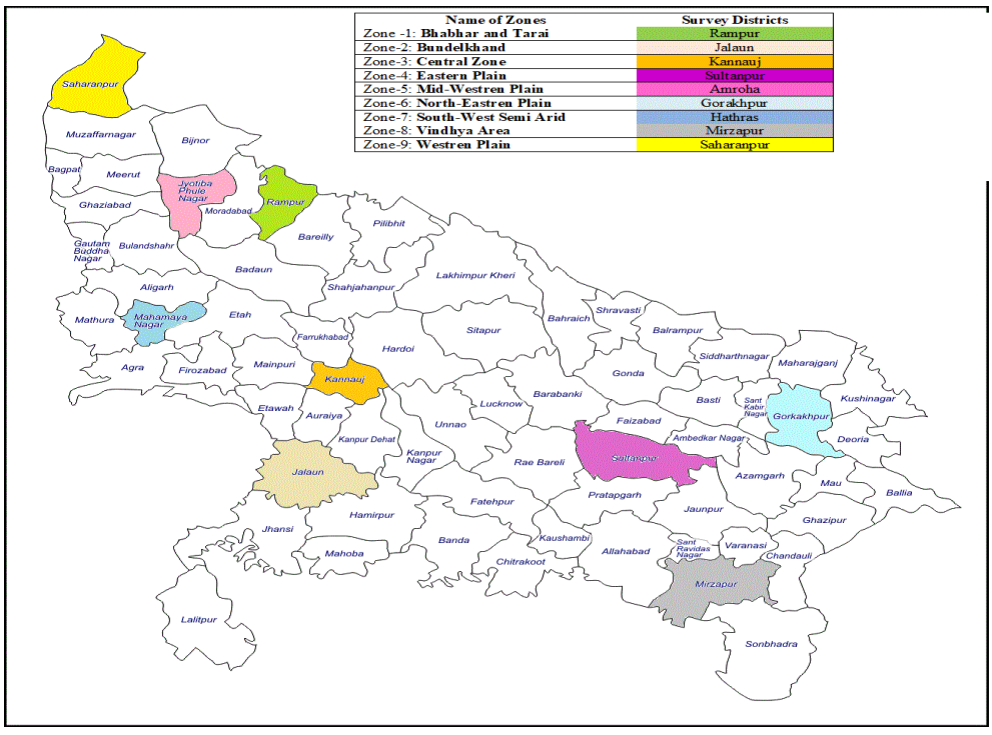


Table 1.2: Percentage Share of Horticulture Area in Gross Cropped Area (TE-2018) under selected District

Agro climatic zone	Selected District under agro climatic zone	percent share of horticulture area in Gross Cropped Area (TE-2018)
Zone 1	Rampur	4.36
Zone 2	Jalaun	13.08
Zone 3	Kannauj	28.13
Zone 4	Sultanpur	9.89
Zone 5	Shahjahanpur	4.42
Zone 6	Gorakhpur	9.25
Zone 7	Hathras	25.54
Zone 8	Mirzapur	4.68
Zone 9	Saharanpur	9.33

Source: secondary data. Shown in appendix 1

Above table explains the Percentage share of area under horticulture as percent to gross cropped area (TE-2018) under selected district of agro climatic zones of Uttar Pradesh which clearly favors the methodology as the selected districts were taken for field survey on basis of highest area under horticulture crops.

Thereafter two or three blocks in consultation with District Horticulture officer (DHO) to cover the different horticulture crops i.e. vegetables, fruits, flower and spices grown in the selected areas were selected from each district. Further, with the consultation of DHO, four villages from the selected blocks based on the same criteria were taken up for detailed study. In all 25 households from each village were selected on the basis of growing different horticulture crops belonging to different size of land holdings for field survey.

Table 1.3: Sample Distribution on Basis of District, Block and Village Wise:

S. No.	District	Block	Village
1	Saharanpur	Punwarka	Khatauli
			Lakhnauti Kalan
		Nakur	Saroorpur Taga
		Sidhauli	Marwa
2	Gorakhpur	Bhathat	Raghunathpur
			Jangalpur
		Khorawar	Raiganj
			Ramlakhana

S. No.	District	Block	Village
3	**Sultanpur**	Bhadaiya	Mishrapur
			Hanumanganj
		Baldiraipur	Narsada
			Ameer Ali Purwa
4	**Jalaun**	Kadaura	Bhamua
			Shahadatpur
		Dakor	Kharka
		Nadigaon	Bherd
5	**Hathras**	Sasni	Nagla Fatehla
			Firozpur
		Sadabad	Uncha Gaon
			Naseerpur
6	**Mirzapur**	Cityblock	Amoi
			Gosaipur
		Chanbey	Berohi
			Argisarpati
7	**Shahjahanpur**	Gajraula	Sihali Jagir
		Hasanpur	Daulatpur
		Amroha	Najarpur Khurd
		Gangeshwari	Paorara
8	**Kannauj**	Kannauj	Maanpur
			Mehmoodpur
		Jalalabad	Baseerapur
			Jashnipurwa
9	**Rampur**	Suar	Haridaspur
			Aglaga
		Bilaspur	Kemri
			Pajiya

Note: Field survey, 2019.

Appendix 1 shows the trends in area, output and yield of horticulture crops at the state and district level collated from secondary sources since last 5 years i.e. from 2013-14 to 2017-18. Appropriate statistical techniques have been used to analyse secondary data. The basic statistics have been used to know the average status of horticulture crops in the different agro-climatic zones. Compound growth rates have been calculated by fitting linear regression using following formula: CAGR = (Anti log b-1) x 100. The growth rate in Area, production and yield over years has been estimated using the same formula.

VIII: Scope of the Study

Horticulture is endowed with agro climatic condition which is suitable for a large number of horticulture crops and it can be competitive if its weakness is converted into its opportunities.

Since, it can be observed that there is increase in its area, production and productivity which can be further improved upon if gaps such as lack of adequate and efficient technology, lack of awareness etc. are taken care off by providing proper suggestions based on the empirical musings from this study. Hence, the present study takes into account the detail significance of the horticulture crops in different agro climatic zones of Uttar Pradesh. It explains the present status of horticulture sector across the districts and agro climatic zones of the State. The scope of the study focuses on the socio- economic condition of the horticulture growers and deals with the major problems they confront in growing of horticulture crops in selected districts and also provide various findings and suggestion to improve the condition of growers. Thus, the study would be important both from methodological and policy viewpoints.

IX: Chapter Scheme

The report has been presented in 5 chapters. Chapter 1 presents the Introduction, review of literature, research problem, objectives and research methodology of the study. In Chapter II we have analyzed the secondary data to show the Horticulture Development in the State of Uttar Pradesh. Chapter III presents the socio- economic characteristics of horticultural growers. Chapter IV discussed the major constraints in the horticulture crops in the selected districts and critically examines the Government policy to deal with these problems and to promote Horticulture production in different agro-climatic areas. The final Chapter summarizes the main findings of the study and gives suggestions for improving the condition of horticulture crop growers and steps to promote horticulture export from the country.

Appendix 1

Percentage share of Horticulture area in Total GCA in agro climatic Zone

Name of Districts	percent share of Horticulture Area in Gross Cropped Area (TE-2015)	percent share of Horticulture Area in Gross Cropped Area (TE-2018)	Growth rate of Area during 2014-2018
Bijnor	2.19	2.33	2.5
Moradabad	3.97	4.81	8.9
Pilibhit	1.59	1.75	5.1
Rampur	3.83	4.36	4.2
Zone -1 Bhabhar and Tarai Zone	**2.89**	**3.31**	**5.18**
Banda	0.83	0.89	5.1
Chitrakoot	1.39	1.64	9.2
Hamirpur	2.07	2.28	6.8
Jalaun	12.14	13.08	5.0

Name of Districts	percent share of Horticulture Area in Gross Cropped Area (TE-2015)	percent share of Horticulture Area in Gross Cropped Area (TE-2018)	Growth rate of Area during 2014-2018
Jhansi	6.19	6.59	5.0
Lalitpur	6.27	6.63	4.6
Mahoba	4.45	4.70	4.5
Zone-2 Bundelkhand Zone	**4.76**	**5.12**	**5.74**
Allahabad	5.87	6.15	3.6
Amethi	5.94	6.99	4.3
Auraiya	4.56	4.76	3.3
Etawah	9.97	10.44	3.2
Farrukhabad	26.01	27.31	3.3
Fatehpur	7.34	9.37	13.0
Hardoi	4.02	4.55	6.0
Kannauj	26.66	28.13	3.2
Kanpur Dehat	3.76	4.21	5.9
Kanpur Nagar	10.46	12.65	9.2
Kaushambi	9.45	11.23	10.0
Kheri	1.66	2.01	9.0
Lucknow	20.89	23.46	4.6
Pratapgarh	9.80	9.78	2.5
Rae Bareli	4.17	4.42	7.0
Sitapur	3.88	4.29	3.9
Unnao	8.43	9.59	6.2
Zone-3 Central Zone	**9.58**	**10.55**	**5.77**
Ambedkar Nagar	5.88	6.37	4.1
Azamgarh	3.10	3.32	3.3
Ballia	5.75	6.26	3.9
Barabanki	4.99	5.63	4.6
Chandauli	1.13	1.20	3.7
Faizabad	7.14	8.23	6.8
Ghazipur	4.64	5.04	4.6
Jaunpur	4.05	4.32	3.3
Mau	1.83	1.97	3.9
Sultanpur	9.38	9.89	3.2
Varanasi	6.95	8.15	8.3
Zone-4 Eastern Plain Zone	**4.99**	**5.49**	**4.52**
Amroha	7.34	8.28	6.4
Bareilly	3.25	3.52	4.1
Budaun	5.63	6.11	3.6
Sambhal	4.04	4.55	5.0
Shahjahanpur	3.97	4.42	4.0
Zone-5 Mid-Western Plain Zone	**4.85**	**5.37**	**4.63**
Bahraich	2.61	3.09	9.9
Balrampur	1.87	2.04	3.7
Basti	4.36	4.85	5.0
Deoria	2.54	2.69	3.1
Gonda	2.78	3.47	10.5

Name of Districts	percent share of Horticulture Area in Gross Cropped Area (TE-2015)	percent share of Horticulture Area in Gross Cropped Area (TE-2018)	Growth rate of Area during 2014-2018
Gorakhpur	7.57	9.25	10.3
Kushi Nagar	6.50	8.12	11.1
Maharajganj	4.01	4.66	7.6
Sant Kabeer Ngr	5.36	5.99	4.8
Shravasti	1.77	1.94	5.1
Siddharth Nagar	2.25	2.35	3.0
Zone-6 North-Eastern Plain Zone	**3.78**	**4.40**	**6.74**
Agra	18.91	20.32	3.9
Aligarh	9.59	8.15	-8.3
Etah	10.51	11.41	4.6
Firozabad	20.82	22.76	4.8
Hathras	24.73	25.54	2.6
Kasganj	11.00	11.77	4.9
Mainpuri	10.72	11.61	6.1
Mathura	4.44	4.80	4.4
Zone-7 South-West Semi Arid Zone	**13.84**	**14.54**	**2.86**
Mirzapur	4.06	4.68	9.5
Sant Ravidas Ngr.	5.09	5.28	2.7
Sonbhadra	3.03	3.27	5.4
Zone-8 Vindhya Area	**4.06**	**4.41**	**5.86**
Baghpat	3.41	3.72	4.4
Bulandshahr	6.79	7.29	3.9
G B Nagar	0.93	1.03	3.8
Ghaziabad	7.88	9.01	5.7
Hapur	7.16	7.99	5.4
Meerut	7.99	8.83	5.0
Muzaffarnagar	4.07	4.41	3.4
Saharanpur	8.91	9.33	2.4
Shamli	3.72	4.20	5.8
Zone-9 Westren Plain Zone	**5.65**	**6.20**	**4.41**

CHAPTER II

Horticulture Development in the Uttar Pradesh

I INTRODUCTION

In recent years, horticulture sector has emerged as an important component of the Indian economy because of its contribution in the gross domestic production of the agricultural sector. Horticulture crops not only provide nutrition but also generate cash income to the growers. It covers a wide range of fruits, vegetables, spices, medicinal plants etc. and requires a suitable climate. U.P.'s varied agro climatic zones is suitable for producing all kinds of horticulture crops. The total production of horticulture in Uttar Pradesh was estimated 392.48 million tonnes from a total area of 2477.04 million hectare. The major horticulture crops comprise of vegetables with total production of 28316.45 million tonnes and fruits 10539.775 million tonnes in the year 2017-18 which shows that U.P. holds vast potential for its development of horticulture (**MIDH Report, 2018-19**). In spite of so many positive factors, horticulture sector of Uttar Pradesh is still far from realization of its actual potential. For the commercialization of horticultural crops and diversification of agriculture in the state, various programmes are being implemented within the state by state government like expansion of area, rejuvenation of old mango, guava and orchards, production of quality planting material and post-harvest management etc.

II: Mission for Integrated Development Horticulture

Mission for Integrated Development of Horticulture (MIDH) is a Centrally Sponsored Scheme implemented in 2014-15 for the holistic growth of horticulture sector covering fruits, vegetables, root & tuber crops, mushrooms, spices, flowers, aromatic plants, coconut, cashew, cocoa and bamboo. MIDH also provides technical advice and administrative support to State Governments/ State Horticulture Missions (SHMs). The schemes under MIDH includes: National Horticulture Mission (NHM), Horticulture Mission for north East and Himalayan states (HMNEH), National Horticulture board (NHB), Central institute for Horticulture (CIH), Coconut Development Board (CDB).

Under MIDH, Government of India (GOI) contributes 60percent of total outlay for developmental programmes in all the states except states in North East and Himalayas and 40percent share is contributed by State Governments. In the case of North Eastern States and

Himalayan States, GOI contributes 90percent. In case of National Horticulture Board (NHB), Coconut Development Board (CDB), Central Institute for Horticulture (CIH), Nagaland and the National Level Agencies (NLA), GOI contributes 100percent.

National Horticulture Board (NHB) was set up by the Government of India in April 1984 as a commercial horticulture on the basis of recommendation of the "group on perishable agriculture commodities". The NHB is registered as an autonomous society under the society's registration act 1860, with its headquarter at Gurgaon. NHB is implementing various schemes under MIDH in all states and UTs where GOI contributes 100percent.

National Horticulture board was set up with a vision to accelerate the process of the development of commercial horticulture in potential cluster by organizing the producer farmers for better utilization of resources and technology. There are various schemes developed by the horticulture board to fulfill an objective of providing training and education to farmers, to promote research and development programmes in order to encourage technology, to strengthen the market information system, and to develop high quality horticulture farms and promote horticulture activity in identified belts.

III: Schemes of NHB

1: Promotion of commercial horticulture scheme

2: Creation of cold storage Capacity and Scheme.

3: Technology Development and transfer for promotion of horticulture.

4: Market Information Services scheme for horticulture crops.

5: Horticulture promotion service.

IV: National Horticulture Mission

National Horticulture Mission (NHM) was developed as one of the sub schemes of MIDH and as a mission to give direction and to promote development of horticulture in selected states .It is being implemented by State Horticulture Mission in selected districts of 18 states and four union territories .It was promoted by Government of India in the year 2005-06 with a key objective to provide holistic growth of the horticulture sector in the country and to develop it to the maximum potential available in the state and to augment production of all horticultural products (fruits, vegetables, flowers, crops, spices, medicinal aromatic plants) in

the state.The Government of India contributes 85percent of share and 15percent of share is contributed by the state government. Other objectives of NHM include enhancing of horticulture production, to promote and develop disperse technology and to create opportunities for employment generation.

After the launch of National Horticulture Mission (NHM) in 2005-06, significant progress has been made in area expansion under horticulture crops resulting in higher production. Over the last decade, India's total production of horticulture crops is estimated to be 311.7 million tonnes from an area of 25.43 million hectares, where it was observed that the production of vegetables has increased from 178.172 million tonnes to 184.40 million tonnes during 2016-2017 to 2017-18. The production of fruits also showed a significant increase from 90.2. Million tonnes to 97.4 million tonnes (Area and Production of Horticulture Crops (Agriculture Coopereation and Farmers Welfare, Horticulture report 2017-18).

Table 2.1: India's Total Production under Horticulture Crops (in million tons)

Year	**Total horticulture production**	**Total fruits production**	**Total Vegetables production**
2015-16	286.2	90.2	169.1
2016-17	300.6	92.9	178.172
2017-18	311.74	97.4	184.40

(**Source**: http://agricoop.nic.in/statistics/state-level

National Horticulture Board has implemented various schemes under the Ministry of Integrated Development of Horticulture in all the States and Union territories .The table 2.2 indicates the total number of projects and the amount of subsidy released under various schemes of NHB between 2005-06 to 2017-18.It shows that Maharashtra is at the top with 48.2 percent in terms of projects with 23.7 percent of total subsidy released, followed by Karnataka at second position (projects undertaken). these two states dominate all other states in terms of projects allocation. Uttar Pradesh has a share of mere 2.7 percent under project allocation but has a good share in subsidy allocation (13.1 percent).

Table2.2: Number of Projects and Amount of Subsidy Released under Scheme 1, 2 & 3 from 2005- 06 to 2017-18

Programmers	Scheme 1*		Scheme 2$		Scheme 3$		Total			
States	Projects (No.)	Allocation (Rs. Lakh)	Projects (No.)	Allocation (Rs. Lakh)	Projects (No.)	Allocation (Rs. Lakh)	No of Total Projects	Share in All	Total Allocation (Rs. Lakh)	Share in All
Maharashtra	49.6	30.6	5.6	5.3	7.7	9.4	22609	48.2	44936	23.7
Uttar Pradesh	**2.2**	**2.2**	**50.6**	**43.4**	**7.5**	**10.0**	**1275**	**2.7**	**24929**	**13.1**
Karnataka	13.6	14.7	1.1	1.4	4.3	8.3	6221	13.3	21087	11.1
Gujarat	5.4	9.5	2.0	3.1	1.1	0.8	2472	5.3	14632	7.7
Tamil Nadu	3.1	9.0	0.8	0.6	1.5	2.1	1416	3	12677	6.7
Haryana	0.7	3.8	10.1	10.7	1.5	0.5	361	0.8	10530	5.5
Madhya Pradesh	3.8	5.0	2.8	3.0	1.6	2.7	1756	3.7	8370	4.4
Punjab	1.0	2.8	5.3	7.3	1.9	2.4	490	1	7545	4
Rajasthan	2.3	3.6	4.7	4.2	4.1	4.5	1089	2.3	7192	3.8
Himachal Pradesh	1.3	2.9	1.4	3.7	0.8	4.6	582	1.2	5891	3.1
Uttarakhand	2.3	3.2	0.8	0.5	10.8	1.3	1165	2.5	4664	2.5
Jammu & Kashmir	0.5	0.7	1.7	5.9	21.1	3.0	496	1.1	3945	2.1
Telangana	4.8	2.6	0.0	0.0	1.0	0.2	2183	4.7	3601	1.9
Andhra Pradesh	1.8	1.1	4.5	3.6	1.8	2.8	868	1.8	3377	1.8
Orissa	1.1	2.2	0.3	0.4	4.8	2.7	554	1.2	3347	1.8
Chhattisgarh	0.7	1.3	2.5	2.1	1.5	1.1	329	0.7	2941	1.5
Kerala	1.4	2.0	0.6	0.2	0.3	0.3	646	1.4	2899	1.5
Assam	0.3	0.2	2.0	3.0	3.0	3.1	163	0.3	1774	0.9
West Bengal	1.5	0.7	1.4	0.5	3.3	1.7	714	1.5	1306	0.7
Jharkhand	0.1	0.1	0.3	0.5	0.4	0.9	37	0.1	451	0.2
Bihar	1.2	0.2	0.0	0.0	3.2	4.1	567	1.2	397	0.2
Sikkim	0.3	0.1	0.0	0.0	4.3	9.6	178	0.4	395	0.2
All India	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**46920**	**99.7**	**189854**	**99.2**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India
Note: * During 2005-06 to 2017-18 and $ during 2010-11 to 2017-18, Scheme 1*= Promotion of Commercial Horticulture, Scheme 2$ = Creation of Cold Storage Capacity and Scheme http://nhb.gov.in/PDFViwer.aspx?enc=3ZOO8K5CzcdC/Yq6HcdIxMvJ0RY/w0FTznMeREnr5ok=e 3$ = Technology Development & Transfer for Promotion of Horticulture.

V: Export status: The table 2.3 explains the composition of horticulture crops export from India. It was found that percentage share of quantity in the triennium year has increased for Spices crops i.e. from 22.1 percent quantity in TE 2009-12 to 24 percent in TE 2015-18. Further, the table reveals that after spices export, cashew and vegetable crops has shown much improvement in terms of export i.e. 14.7 percent and 13.3 percent respectively. Processed fruits and fresh fruits also showed improvement in terms of export i.e. to 9.5 percent. Hence, it can be said that the percentage share of various horticulture crops in various trennium year have shown much improvement in terms of export of various crops from India.

Table 2.3: Composition of Horticulture Crops Export from India (Principal Commodities)

Product Name	TE-2009-12				TE-2012-15				TE-2015-18			
	Absolute		percentshare		Absolute		percentshare		Absolute		percentshare	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Spices	715995	8979	22.1	44.0	917452	15055	24.0	45.0	305833	5048	24.0	45.0
Cashew	102547	3337	3.2	16.3	119799	4909	3.1	14.7	39935	1647	3.1	14.7
Fresh Vegetables	1911033	2886	58.9	14.1	2218325	4468	57.9	13.3	739481	1498	57.9	13.3
Processed fruits & Juices	0	2014	0.0	9.9	0	3178	0.0	9.5	0	1066	0.0	9.5
Fresh Fruits	470173	1606	14.5	7.9	514732	3160	13.4	9.4	171587	1059	13.4	9.4
Processed Vegetables	0	845	0.0	4.1	0	1372	0.0	4.1	0	460	0.0	4.1
Vegetable Oils	19376	189	0.6	0.9	33547	458	0.9	1.4	11183	153	0.9	1.4
Floriculture	0	319	0.0	1.6	0	447	0.0	1.3	0	150	0.0	1.3
Fruits / Vegetable Seeds	11754	206	0.4	1.0	16335	396	0.4	1.2	5445	133	0.4	1.2
Cashew Nut Shell Liquid	12110	40	0.4	0.2	9870	41	0.3	0.1	3290	14	0.3	0.1
Total	**3242989**	**20420**	**100.0**	**100.0**	**3830060**	**33484**	**100.0**	**100.0**	**1276753**	**11228**	**100.0**	**100.0**
Percentage	15	17	0.0	0.1	10	14	0.0	0.0	3	5	0.00	0.04

Source: https://agriexchange.apeda.gov.in/indexp/reportlist.aspx

Note: Qty in MT; Value in Rs. Crore

Table 2.4 explains the composition of horticulture export from Uttar Pradesh. It shows that maximum export from Uttar Pradesh is of fresh vegetable crops which constitutes about 45.2 percent of quantity with share of 29.2 percent of export in terms of Rs. Crore. In TE 2012-15, the proportion of percentage share of export of vegetables was 51.7 percent of quantity. Further, the production of export for fruits and vegetables seeds was recorded as 14.3 percent under quantity of export in T.E 2012-15 which increased to 16.9 percent in T.E 2015-18 with 22.7 Rs crore of export. The percentage share (in quantity) of onion, one of the important crops of Uttar Pradesh, got increased from 16.2 percent in T.E 2009-12 to 21.1 percent in T.E. 2015-18. Thus, it can be said that horticulture crops have an important share agricultural exports in Uttar Pradesh.

Table 2.4: Composition of Horticulture Export from Uttar Pradesh

Product Name	TE-2009-12				TE-2012-15				TE-2015-18			
	Absolute		percentshare		Absolute		percentshare		Absolute		percentshare	
	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value	Qty	Value
Other Fresh Vegetables	83993	48	47.8	29.6	88212	116	51.7	31.0	149906	167	45.2	29.2
Fruits & Vegetables Seeds	34967	35	19.9	21.3	24473	76	14.3	20.4	56154	130	16.9	22.7
Fresh Onions	28492	24	16.2	14.7	32034	60	18.8	16.0	69896	112	21.1	19.7
Processed Vegetables	6688	30	3.8	18.5	6309	70	3.7	18.6	4352	72	1.3	12.6
Other Fresh Fruits	15168	14	8.6	8.5	14876	30	8.7	8.1	45480	56	13.7	9.8
Processed Fruits, Juices & Nuts	802	4	0.5	2.2	616	6	0.4	1.6	1216	14	0.4	2.4
Others (Betel Leaves & Nuts)	102	0	0.1	0.3	134	1	0.1	0.4	262	5	0.1	0.9
Walnuts	124	1	0.1	0.4	67	2	0.0	0.4	154	4	0.0	0.8
Fresh Grapes	3568	4	2.0	2.7	2177	7	1.3	1.8	1986	4	0.6	0.8
Fresh Mangoes	1339	1	0.8	0.8	1259	3	0.7	0.8	1658	3	0.5	0.6
Mango Pulp	309	1	0.2	0.8	469	3	0.3	0.8	366	3	0.1	0.5
Floriculture	73	1	0.0	0.4	32	0	0.0	0.1	37	1	0.0	0.1
Cucumber And Gherkins (Prepd. & Presvd)	2	0	0.0	0.0	1	0	0.0	0.0	9	0	0.0	0.0
Total	**175627**	**163**	**100.0**	**100.0**	**170657**	**374**	**100.0**	**100.0**	**331477**	**570**	**100.0**	**100.0**

Source: https://agriexchange.apeda.gov.in/indexp/reportlist.aspx
Note: Qty in MT; Value in Rs. Crore

Table 2.5 shows the comparison of export of principal commodities from agriculture and horticulture and percentage change in export. It shows that in agriculture, 86.2 percent export (in quantity) was estimated in T.E 2009-12 which increased to 90.4 percent in year 2012-15 but it declined to 84.3 perecent in year 2015-18. Horticulture sector emerged as an important sector for the development of India as the percentage share of export of horticulture crops increased from 13.8 percent to 16.4 percent in year 2009-12 to 2018-19.

Table 2.5: Export from India (Principle Commodities)

	2009-12		2012-15		2015-18		2018-19 (April-August)	
	Quantity	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**
Agriculture	20230879	104742	36117378	206535	26387280	185639	20572546	150906
	(86.2)	(83.7)	(90.4)	(86.0)	(84.3)	(81.9)	(83.6)	(81.7)
Horticulture	3242989	20420	3830060	33484	4924733	41158	4039165	33832
	(13.8)	(16.3)	(9.6)	(14.0)	(15.7)	(18.1)	(16.4)	(18.3)
Total	**23473868**	**125162**	**39947438**	**240019**	**31312013**	**226797**	**24611711**	**184738**
	percent change in export		**41.24**	**47.85**	**-27.58**	**-5.83**	**-27.22**	**-22.77**

Source: https://agriexchange.apeda.gov.in/indexp/reportlist.aspx
Note: Qty in MT; Value in Rs. Crore

Table 2.6 explains the percentage share of export of agriculture and horticulture crops from Uttar Pradesh. It explains that in 2009-12, 79 percent of agriculture products in terms of quantity & 96.5 percent in terms of value were exported from U.P. which increased to 91.9 & 97.9 percent in year 2012-15 respectively. But in recent years i.e. 2018-19 it declined to 78.3 percent in quantity terms and 97.2 percent in value terms. It shows that export of horticulture products in Uttar Pradesh has was very law however it increased slightly in the recent years.

Table 2.6: Export from Uttar Pradesh (Principle Commodities)

Item/Year	2009-12		2012-15		2015-18		2018-19 (April-May)	
	Quantity	**Value**	**Quantity**	**Value**	**Quantity**	**Value**	**Quantity**	**Value**
	667518	4514	1932804	17857	1593671	16758	790688	10008
Agriculture	(79.2)	(96.5)	(91.9)	(97.9)	(82.8)	(96.7)	(78.3)	(97.2)
Horticulture	175627	163	170657	374	331477	570	219564	288
	(20.8)	(3.5)	(8.1)	(2.1)	(17.2)	(3.3)	(21.7)	(2.8)
	843145	**4677**	**2103461**	**18231**	**1925148**	**17328**	**1010252**	**10296**
Total	**percent change in export**		**59.92**	**74.34**	**-9.26**	**-5.21**	**-90.56**	**-68.30**

Source: https://agriexchange.apeda.gov.in/indexp/reportlist.aspx
Note: Qty in MT; Value in Rs. Crore

VI: STATE WISE AREA AND PRODUCTION

Table 2.7: State Wise percent Share and CAGR of Area and Production of all Horticulture Crops during 2008-09 to 2017-18

Major States	Area				Production			
	TE - 2011	**TE - 2018**	**CAGR 2009-13**	**CAGR 2014-18**	**TE - 2011**	**TE - 2018**	**CAGR 2009-13**	**CAGR 2014-18**
Andhra Pradesh	9.1	5.7	4.48	-0.70	9.3	7.4	10.87	7.82
Arunachal Pradesh	0.4	0.3	5.51	-14.89	0.1	0.1	27.64	-24.44
Assam	2.4	2.7	7.57	1.51	2.4	2.0	3.40	-0.38
Bihar	5.4	4.7	1.58	0.02	7.8	6.5	5.12	1.98
Chhattisgarh	2.4	3.0	8.89	4.66	2.2	3.1	13.67	7.05

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Goa	0.5	0.1	0.79	-40.09	0.1	0.1	4.31	-15.14
Gujarat	5.5	6.6	11.24	1.02	6.7	7.7	11.54	2.44
Haryana	1.8	2.0	6.44	4.75	2.0	2.5	8.79	6.70
Himachal Pradesh	1.4	1.3	2.71	1.25	0.9	0.8	3.21	-0.84
Jammu & Kashmir	1.5	1.7	15.90	2.05	1.4	1.2	6.75	2.30
Jharkhand	1.5	1.6	9.34	-1.07	2.0	1.5	6.44	-3.93
Karnataka	8.5	8.3	3.79	2.36	7.1	6.9	8.10	3.11
Kerala	8.1	6.3	-2.05	0.69	4.5	3.4	0.21	2.16
Madhya Pradesh	3.1	7.0	20.76	13.09	3.1	8.5	32.87	8.23
Maharashtra	11.1	7.0	2.23	-8.12	7.8	7.5	2.05	1.21
Manipur	0.4	0.4	6.27	5.07	0.2	0.3	7.72	0.97
Meghalaya	0.5	0.5	1.66	1.20	0.3	0.3	0.50	0.13
Mizoram	0.4	0.6	13.66	1.32	0.2	0.2	18.46	-8.93
Nagaland	0.2	0.4	20.41	2.86	0.1	0.3	21.46	2.39
Orissa	6.1	5.5	1.17	0.47	4.7	3.9	3.93	-0.92
Punjab	1.3	1.5	2.87	6.04	2.2	2.2	2.96	5.51
Rajasthan	4.7	6.5	9.37	6.67	1.0	1.4	10.18	14.42
Sikkim	0.3	0.3	1.94	5.90	0.1	0.1	10.43	13.85
Tamilnadu	6.1	5.3	2.80	-3.49	8.0	6.0	11.47	-5.25
Tripura	0.4	0.5	13.67	-3.71	0.5	0.5	15.59	-4.09
Uttar Pradesh	**7.1**	**8.9**	**-2.38**	**13.55**	**11.0**	**12.8**	**-0.14**	**10.23**
Uttrakhand	1.3	1.2	3.76	0.78	0.8	0.6	1.96	-2.08
West Bengal	8.1	7.4	0.79	1.18	12.0	9.9	3.03	3.84
All India	**100.0**	**100.0**	**4.08**	**1.60**	**100.0**	**100.0**	**6.13**	**3.04**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g

Table 2.7 presents the state wise share and CAGR of area and production of all horticulture crops during 2008-09 to 2017-18 which shows a mixed result. Triennium estimate (of area)in Uttar Pradesh reported a negative CAGR of 2.38 percent during 2009-13 and CAGR of 13.55percent during 2014-18. Similar trend is examined for CAGR of production in Uttar Pradesh during 2009-13 and 2014-18. State wise data shows that the best performance in terms of CAGR for 2014-18 in area and production under horticulture crops was reported in Madhya Pradesh followed by other states. Negative CAGR was reported by Arunachal Pradesh, Assam, Bihar, Goa, Jharkhand, Mizoram, Orissa, Tripura and Uttarakhand.

Table 2.8: States wise percent Share and CAGR of Area and Production of all Fruit Crops during 2008-09 to 2017-18

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Andhra Pradesh	13.3	9.6	-3.01	1.44	15.7	13.9	1.30	12.08
Arunachal Pradesh	1.1	0.9	10.39	-16.85	0.2	0.2	37.37	-24.85
Assam	1.9	2.3	9.59	0.19	2.3	2.2	7.38	1.10
Bihar	4.7	4.7	0.92	-0.14	5.2	4.8	4.02	5.60
Chhattisgarh	2.2	3.4	16.31	2.96	1.7	2.7	15.19	8.62
Goa	0.2	0.2	-1.23	0.32	0.1	0.1	5.22	0.46
Gujarat	5.4	6.4	3.81	3.34	9.3	9.4	8.44	3.13
Haryana	0.7	1.0	6.99	5.02	0.4	0.8	19.62	8.40
Himachal Pradesh	3.3	3.6	2.74	1.12	0.9	0.8	-2.57	-10.06
Jammu & Kashmir	3.9	5.0	20.07	-1.55	2.5	2.4	6.89	4.97
Jharkhand	1.0	1.6	14.01	2.79	0.8	1.1	22.21	5.59
Karnataka	5.6	6.6	4.84	2.19	8.0	7.6	5.91	2.01
Kerala	4.9	4.2	-0.41	-1.38	3.5	2.5	0.32	-6.84
Madhya Pradesh	1.8	5.1	20.23	17.04	4.0	7.2	20.11	6.75
Maharashtra	24.0	11.4	1.71	-14.05	14.4	11.4	-2.05	-3.12
Manipur	0.8	0.8	6.81	-3.43	0.4	0.5	9.11	-3.28
Meghalaya	0.5	0.6	-0.06	-1.18	0.4	0.4	1.63	-0.66
Mizoram	0.5	0.9	13.11	2.27	0.3	0.4	16.88	-0.54
Nagaland	0.4	0.6	16.49	-0.87	0.2	0.4	17.86	-2.08
Orissa	4.8	5.3	3.76	1.30	2.5	2.6	9.28	3.50
Punjab	1.1	1.4	3.51	4.55	1.8	2.0	5.31	5.42
Rajasthan	0.6	0.8	13.38	13.06	0.9	0.9	7.10	8.79
Sikkim	0.2	0.3	7.90	102.29	0.0	0.0	11.05	129.13
Tamilnadu	5.0	4.7	0.75	-0.81	7.8	6.6	74.63	-4.73
Tripura	0.6	1.0	14.88	-6.73	0.8	0.7	9.16	-10.46
Uttar Pradesh	**5.5**	**7.4**	**-1.75**	**7.27**	**7.1**	**11.1**	**3.89**	**12.31**
Uttrakhand	2.9	2.8	3.55	-0.64	1.0	0.7	3.18	-1.94
West Bengal	3.3	4.0	2.05	4.22	4.0	3.9	3.39	6.60
All India	**100.0**	**100.0**	**3.33**	**-1.64**	**100.0**	**100.0**	**4.18**	**2.54**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare, Government of India (http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g)

Table 2.8 depicts percent share and CAGR of area and production of all fruit crops in different states of India. The triennium estimates for area and production calculated for year 2011 and 2018 shows that Maharashtra ranks first with 24percent and 11.4 percent (in terms of area) in T.E respectively. Andhra Pradesh ranks second followed by Uttar Pradesh at 3rd position in term of area of total fruits crops with 5.5percent and 7.4percent respectively. Similarly, the triennium estimates of 2011 and 2018 in terms of total fruit crops production reveals Andhra Pradesh at the top with 15.7percent and 13.9percent respectively followed by Maharashtra with 14.4percent & 11.4percent .Thus, it shows that Maharashtra holds first position in terms of all total fruit crops area and Andhra Pradesh has 1st position in terms of

all total fruit crops production in TE estimates whereas the position of Uttar Pradesh is third in both area and production of total fruit crops .

In terms of CAGR (production and area) of fruit crops, it was found that M.P. (20.23percent) has highest CAGR in term of area of total fruit crops in year 2009-13 followed by Jammu Kashmir and Sikkim .Though Uttar Pradesh recorded a negative CAGR of -1.75percent but its position was much better in 2014-18 in total area of fruit crops as it recorded a growth rate of 7.27percent. Sikkim recorded a highest rate of growth (102.29percent) but here it is significant as area under horticulture crops is very meager. In terms of total production of all fruit crops, the rate of growth of Sikkim was 129.13 in 2014-15 followed by Uttar Pradesh (12.31percent) which is much higher than India's rate of growth (2.54percent) which is very encouraging.

Table 2.9: States wise percent Share and CAGR of Area and Production of all Vegetable Crops during 2008-09 to 2017-18

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Andhra Pradesh	5.3	2.3	24.46	-11.97	5.5	3.8	27.89	2.30
Arunachal Pradesh	0.1	0.0	-39.89	13.33	0.0	0.0	-12.85	-22.43
Assam	3.1	3.0	3.46	1.70	2.5	2.0	-0.90	-1.29
Bihar	10.2	8.2	1.08	0.36	10.2	8.4	5.22	1.03
Chhattisgarh	3.9	4.8	5.84	5.84	2.7	3.8	13.12	6.63
Goa	0.1	0.1	4.48	0.52	0.0	0.0	10.21	0.52
Gujarat	5.4	6.4	8.96	1.70	5.7	7.3	12.71	2.21
Haryana	3.9	4.1	5.63	5.08	3.1	3.7	7.73	6.76
Himachal Pradesh	1.0	0.9	1.96	1.69	1.0	1.0	4.98	3.27
Jammu & Kashmir	0.8	0.6	-0.24	-2.95	1.0	0.8	6.56	-2.45
Jharkhand	3.0	2.8	7.24	-2.35	2.8	1.9	4.15	-6.16
Karnataka	5.5	4.7	-0.21	2.97	5.8	4.6	1.09	1.48
Kerala	1.9	1.3	-2.41	-5.91	2.5	1.2	-0.06	-5.31
Madhya Pradesh	3.4	8.4	24.47	10.61	2.7	9.6	40.69	8.65
Maharashtra	6.2	7.0	3.64	1.82	4.9	6.1	8.17	5.80
Manipur	0.2	0.5	6.00	20.68	0.2	0.2	3.69	8.20
Meghalaya	0.5	0.5	-2.92	3.48	0.3	0.3	-1.37	-0.03
Mizoram	0.2	0.4	38.62	-4.16	0.1	0.1	18.12	-11.42
Nagaland	0.1	0.4	34.89	5.81	0.1	0.3	34.93	4.08
Orissa	7.8	6.3	0.40	-1.58	6.2	4.9	2.87	-2.16
Punjab	2.2	2.3	0.35	6.22	2.6	2.6	2.53	5.52
Rajasthan	1.6	1.7	15.97	2.67	0.7	1.0	5.38	10.96

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Sikkim	0.3	0.3	2.13	6.61	0.1	0.1	4.67	15.58
Tamilnadu	3.4	2.5	0.91	-5.28	6.0	3.7	-0.19	-7.20
Tripura	0.4	0.5	12.58	-0.72	0.3	0.5	23.26	0.47
Uttar Pradesh	**11.6**	**14.0**	**-3.33**	**13.53**	**14.4**	**15.6**	**-1.24**	**9.67**
Uttarakhand	1.0	0.9	2.27	1.53	0.8	0.5	0.34	-2.13
West Bengal	16.2	13.7	0.58	0.29	17.4	14.3	3.01	3.41
All India	**100.0**	**100.0**	**4.09**	**2.49**	**100.0**	**100.0**	**6.29**	**3.02**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g

Table 2.9 depicts percent share and CAGR of area and production of all vegetables crops in different states of India. The triennium estimates for area of all vegetable crops in 2018 shows that Uttar Pradesh ranks first with 14.0percent followed by West Bengal(13.7percent) and Bihar as compared to T.E 2011 which depicts that U.P has put an excellent performance in terms of area of all vegetable crops in given period. The triennium estimates for production of all vegetables crops in T.E 2018 indicates that Uttar Pradesh has highest production with 15.6percent in all vegetables crops than all other states followed by West Bengal and Bihar. Hence, the given table explains that U.P ranks first position in terms of both area and production of total vegetable crops in India in TE 2011-2018.

In terms of CAGR of area and production of Total vegetable crops in 2009-2013 reveals though the Mizoram (38.62percent) and Nagaland (34.89percent) has reported the best figures but their area under vegetable crops is not much as expected. The state of Uttar Pradesh has reported a negative growth (-3.3percent) in India as a whole but it showed much improvement in 2014-2018 with 13.53percent after Manipur. In terms of total production of all vegetable crops, the CAGR has been highest in Madhya Pradesh (40.69percent) followed by Nagaland (34.93percent) while U.P. showed a dismal performance by reporting a negative growth rate of -1.24percent as against all India CAGR (2009-13) of 6.29percent .However, it showed improvement during 2014-2018 by registering a growth of 9.67percent .

Table 2.10: State wise percent Share and CAGR of Area and Production of all Spices Crops during 2008-09 to 2017-18

State	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Andhra Pradesh	11.5	6.4	-1.01	10.03	25.6	12.8	-0.89	9.18
Arunachal Pradesh	0.3	0.3	8.92	3.59	1.1	0.9	12.07	2.03
Assam	1.8	2.9	45.44	3.77	1.9	4.0	125.41	0.60
Bihar	0.4	0.3	4.36	-12.11	0.3	0.1	0.43	-5.18
Chhattisgarh	0.4	0.3	1.32	-0.53	0.2	0.1	18.17	1.87
Goa	0.0	0.0	3.56	-39.22	0.0	0.0	9.68	-12.16
Gujarat	13.1	14.3	20.93	-1.01	12.0	12.6	25.13	1.29
Haryana	0.3	0.5	37.62	1.69	0.9	1.0	39.89	-1.86
Himachal Pradesh	0.2	0.2	11.23	0.75	0.4	0.3	-10.94	12.19
Jammu & Kashmir	0.1	0.1	1.92	0.53	0.0	0.0	5.05	-2.21
Jharkhand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Karnataka	8.8	6.2	0.20	5.98	8.2	5.5	6.86	9.99
Kerala	10.0	4.6	-11.14	0.19	2.8	2.0	-1.44	12.55
Madhya Pradesh	8.5	13.0	13.43	18.71	6.7	12.8	20.80	26.65
Maharashtra	4.3	1.9	1.48	-30.19	2.2	5.0	3.46	41.87
Manipur	0.4	0.3	4.71	0.00	0.3	0.3	40.13	-1.26
Meghalaya	0.6	0.5	-0.02	1.92	1.6	1.2	1.75	2.83
Mizoram	0.8	0.7	-1.10	4.90	2.0	1.1	-2.45	15.54
Nagaland	0.3	0.4	9.49	5.04	0.9	1.2	0.42	22.08
Orissa	5.2	3.8	-4.94	5.33	4.2	2.5	-2.29	3.26
Punjab	0.5	0.9	29.34	14.68	1.1	1.3	23.82	7.70
Rajasthan	20.6	26.7	9.18	3.83	11.7	15.5	20.84	20.53
Sikkim	1.0	0.9	-0.88	-0.43	1.0	0.9	10.46	4.48
Tamilnadu	4.8	2.5	2.21	-19.19	6.0	2.5	9.88	-20.66
Tripura	0.2	0.2	8.55	2.98	0.3	0.3	16.42	12.45
Uttar Pradesh	**2.1**	**4.6**	**1.90**	**45.00**	**4.0**	**3.0**	**6.80**	**0.63**
Uttrakhand	0.1	0.4	50.38	19.37	0.5	0.5	40.21	-3.41
West Bengal	3.6	3.2	0.48	6.31	4.2	4.3	2.97	15.35
All India	**100.0**	**100.0**	**5.96**	**5.22**	**100.0**	**100.0**	**11.02**	**9.66**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g

Table 2.10 indicates the percent share and CAGR of area and production of all spices crops in different states of India. The triennium estimates for area of all spices crops in 2018 indicate that Rajasthan (26.7percent) has been the top performer followed by Gujarat (14.3percent)

and Andhra Pradesh (6.4percent) where U.P.'s performance was not found satisfactory as it was just 4.6 percent .In terms of C.A.G.R in year 2009-13, Assam recorded the highest growth rate of 45.44percent followed by Haryana .Further, it was found that U.P.'s growth rate was not satisfactory during 2009-13 but it has shown much improvement during 2014-18 with an increase of 45.00percent followed by Uttarakhand (19.37percent) and Madhya Pradesh (18.71percent) as against an all India average of 5.22percent.

In terms of total spices production within all states in triennium year 2011, Andhra Pradesh (25.6percent) was the top performer followed by Gujarat (12percent) and Rajasthan (11percent) whereas U.P.'s share was just 4percent (which decline with 1percent in T.E 2018) which is not at all satisfactory.

On basis of CAGR (production) during 2009-13 of all spices crops in all the states, Assam recorded 1st position followed by Uttarakhand (40.21percent) and Manipur (40.13percent). Uttar Pradesh's CAGR was 6.80percent as against all India average of 11.02percent which decline during 2014-18 to 0.63percent as against all India CAGR of 9.66percent. Maharashtra (41.87percent) was the top performer followed by Madhya Pradesh (26.65percent) and Nagaland (22.08percent) during 2014-18.

Hence, it can be said that in terms of both area and production of total spices production, U.P.'s growth was not found satisfactory as compared to other states.

Table 2.11: States wise percent Share and CAGR of Area and Production of Other Horticulture (Flower & Aromatic) Crops during 2008-09 to 2017-18

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Andhra Pradesh	0.2	0.1	2.16	10.90	0.1	0.1	9.10	37.90
Arunachal Pradesh	0.0	0.0	104.26	-56.98	0.0	0.0	307.61	-83.04
Assam	0.0	0.0	39.97	7.17	0.0	0.0	0.0	15.51
Bihar	0.0	0.0	157.96	-3.26	0.0	0.0	56.01	-9.06
Chhattisgarh	0.1	0.1	10.82	4.12	0.0	0.0	11.28	2.86
Goa	0.0	0.0	0.0	158.49	0.0	0.0	0.0	81.44
Gujarat	0.1	0.1	15.00	4.36	0.0	0.1	37.91	-0.47
Haryana	0.0	0.0	6.07	-7.41	0.0	0.0	3.41	-3.15
Himachal Pradesh	0.0	0.0	11.05	-2.10	0.0	0.0	143.19	-17.77
Jammu & Kashmir	0.0	0.2	77.16	277.16	0.0	0.0	142.69	265.79
Jharkhand	0.0	0.0	0.00	-16.54	0.0	0.0	0.00	-30.87
Karnataka	0.1	0.2	3.71	4.23	0.1	0.1	1.19	1.90
Kerala	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Madhya Pradesh	0.2	0.3	32.39	-3.49	0.1	0.2	39.31	-10.69

Major States	Area				Production			
	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18	TE - 2011	TE - 2018	CAGR 2009-13	CAGR 2014-18
Maharashtra	0.1	0.0	6.34	-24.81	0.0	0.0	7.30	-25.51
Manipur	0.0	0.0	0.0	-30.83	0.0	0.0	0.0	32.91
Meghalaya	0.0	0.0	0.0	-39.58	0.0	0.0	0.0	0.0
Mizoram	0.0	0.0	-23.46	-6.53	0.0	0.0	20.59	-78.98
Nagaland	0.0	0.0	0.0	126.11	0.0	0.0	0.0	0.0
Orissa	0.0	0.0	6.25	-2.83	0.0	0.0	2.85	-8.04
Punjab	0.0	0.1	32.24	-1.55	0.0	0.0	-44.47	1.59
Rajasthan	1.3	1.7	5.85	15.58	0.1	0.1	8.58	31.10
Sikkim	0.0	0.0	8.28	0.25	0.0	0.0	0.0	0.62
Tamilnadu	0.2	0.2	3.86	-11.66	0.1	0.2	16.74	7.60
Tripura	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uttar Pradesh	**0.7**	**0.6**	**0.64**	**1.12**	**0.0**	**0.0**	**6.33**	**8.00**
Uttarakhand	0.0	0.0	14.89	1.00	0.0	0.0	32.06	4.56
West Bengal	0.1	0.1	3.90	1.79	0.0	0.0	6.15	2.86
All India	**3.2**	**3.9**	**6.76**	**7.62**	**0.7**	**0.9**	**17.12**	**1.36**

Source: National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g

Table 2.11 explains the percent share and CAGR of area and production of all other horticulture (flowers and aromatic) crops in different states of India .It depicts that in terms of percentage of area in both triennium year 2011 and 2018, Rajasthan (1.3percent and 1.7percent) is at top position followed by U.P. (0.7percent and 0.6percent) as against all India percentage of 3.2 and 3.9. CAGR (area) 2009-13 indicates that Bihar (157.96) registered the highest growth in area of all other horticulture crops followed by Arunachal Pradesh (104.26).

In terms of CAGR (area) 2014-18, Jammu & Kashmir led the way with 277.16percent growth followed by Goa (158.49percent). U.P performed poorly with 0.64percent and 1.12percent growth during 2009-13 and 2014-18 as against all India average growth of 6.76percent and 7.62percent during the same period.

In terms of production of all other horticulture crops within all other states, it was found that TE-2011 and TE-2018 production figures does not yield any significant trend across the States. Arunachal Pradesh (307.61percent) led the way followed by Himachal Pradesh (143.19percent) and Jammu & Kashmir (142.69percent) in terms of CAGR (Production) 2009-13 where U.P. recorded a CAGR of 6.33percent as against All India average of 17.12 during the same period. The CAGR (production) during 2014-18 indicates that Jammu &

Kashmir (265.79percent) ranked first followed by Goa (81.44percent). It is noteworthy that UP showed a little improvement in production of all other crops and recorded a CAGR of 8percent as against all India figure of 1.36percent during the same period.

VII: SHARE AND CAGR OF AREA, PRODUCTION, PRODUCTIVITY of UTTAR PRADESH

Table 2.12: Percentage share and CAGR of Area, Production and productivity of Major Fruit Crops for Uttar Pradesh during 2013-14 to 2017-18

Major Crops	Area		Production		Productivity in MT Per HA	
	TE - 2018	Growth Rate 2014-18	TE - 2018	Growth Rate 2014-18	TE - 2018 (Avg.)	Growth Rate 2014-18
Aonla/Gooseberry	**7.43**	**2.29**	**3.66**	**2.38**	**10.86**	**0.09**
Banana	**14.47**	**18.47**	**29.98**	**18.59**	**45.72**	**0.10**
Guava	**10.38**	**3.29**	**8.84**	**3.51**	**18.78**	**0.22**
Jackfruit	0.13	11.10	0.14	11.02	24.85	-0.08
Litchi	0.89	1.84	0.35	2.25	8.63	0.40
Mango	**55.89**	**1.73**	**43.41**	**2.83**	**17.14**	**1.09**
Muskmelon	4.40	5.44	5.18	5.45	26.01	0.01
Papaya	0.40	107.75	0.88	108.52	48.11	0.37
Watermelon	2.84	6.04	5.81	6.10	45.07	0.06
Other Citrus	0.84	4.94	0.15	6.69	3.86	1.66
Other Fruits	2.33	1.47	1.61	1.39	15.21	-0.07
Uttar Pradesh	**100.00**	**2.64**	**100.00**	**7.33**	**22.06**	**4.56**

Productivity increase of any horticulture crops is an ultimate indicator of success of any state. Hence, it is important to study the productivity of any horticulture crops to analyze the growth rate in particular state. The table 2.12 presents the percentage share of area and growth rate of area, production and productivity of major fruit crops of particular state. Uttar Pradesh's triennium estimates of 2018 shows that Mango (55.89percent) covers highest area under major fruit crops followed by banana and guava. The highest growth rate in area during 2014-18 is reported by papaya (107.75percent) followed by Banana and Jackfruit. A similar trend was found for production of major fruit crops in U.P on the basis of both triennium estimates and growth rate.

The overall growth rate of U.P in area and production is recorded as 2.64percent and 7.33percent respectively. The triennium estimates 2018 presents the estimation of average productivity of major fruit crops which clearly depicts that it is highest under papaya (48.11percent) followed by Banana (45.72percent), watermelon (45.02) and Jackfruit (24.85percent). The Growth rate in productivity is reported highest in other citrus fruits (1.66)

and water melon (1.09percent). The overall growth rate under productivity was 4.56percent in the state of U.P.

Table 2.13: Percentage share and CAGR of Area, Production and productivity of Major Vegetables Crops for Uttar Pradesh during 2013-14 to 2017-18

Major Crops	Area		Production		Productivity in MT Per HA	
	TE - 2018	Growth Rate 2014-18	TE - 2018	Growth Rate 2014-18	TE - 2018	Growth Rate 2014-18
Bitter Gourd	0.23	21.57	0.19	23.63	12.46	1.69
Bottle Gourd	0.78	16.41	1.05	16.67	19.67	0.22
Brinjal	0.43	16.56	0.67	18.46	22.91	1.63
Cabbage	0.47	36.44	0.74	37.08	22.80	0.46
Carrot	0.34	14.59	0.39	15.62	16.70	0.90
Cauliflower	1.42	18.92	1.48	20.87	22.85	1.64
Kaddu/Pumpkin	0.78	19.46	1.36	20.11	38.20	0.54
Okra /Ladies Finger	1.85	16.61	1.13	18.63	13.40	1.73
Onion	2.12	2.45	1.60	1.59	16.56	-0.84
Peas (Green)	**17.93**	**4.63**	**9.30**	**6.28**	**11.36**	**1.58**
Pointed Gourd /Parwal	0.17	15.56	0.21	17.51	26.72	1.69
Potato	**49.86**	**1.65**	**55.75**	**6.91**	**24.47**	**5.18**
Radish	0.47	23.24	0.55	23.59	25.74	0.29
Sweet Potato	1.40	1.60	0.85	1.67	13.24	0.07
Tomato	1.71	30.54	3.09	30.70	39.58	0.12
Other Vegetables	18.06	9.88	19.46	7.41	23.73	-2.25
Uttar Pradesh	**100.00**	**5.23**	**100.00**	**8.35**	**21.88**	**2.96**

Table 2.13 explains the percentage share and CAGR of area, production and productivity of Major Vegetable Crops for Uttar Pradesh during 2013-14 to 2017-18. The Triennium estimate of area 2018 indicates that highest area is under potato (49.86percent) followed by other vegetables (18.06percent) and peas (green 17.93percent). The growth in area during 2014-18 has been found very significant under cabbage (36.44percent) followed by Tomato (30.54percent), Radish (23.24percent) and bitter gourd (21.57percent) whereas the growth rate of area under all vegetable crops in the state was found to be 5.23percent.

In terms of TE- 2018, the production is very significant under potato (55.75percent) followed by other vegetables (19.46percent) and peas green (9.30percent) where the growth rate in production during 2014-18 is highest of cabbage (37.08percent) followed by tomato (30.70percent), bitter gourd (23.63percent) and Radish (23.59percent). The state of U.P. as a whole production under all vegetable crops reported growth rate of only 8.35percent.

The Triennium estimate 2018 of average productivity per hectare is found significant under tomato (39.58percent). The state as a whole has reported and observed a good increase in

productivity (21.88percent) in TE estimates 2018 while the state of U.P. reported productivity growth rate of 2.96percent. It was found that the growth in productivity per hectare 2014-18 was found significant in case of potato while it is negative (-0.84) for onions.

Table 2.14: Percentage share and CAGR of Area, Production and productivity of Major Spices Crops for Uttar Pradesh during 2013-14 to 2017-18

Major Crops	Area		Production		Productivity in MT Per HA	
	TE - 2018	Growth Rate 2014-18	TE - 2018	Growth Rate 2014-18	TE - 2018	Growth Rate 2014-18
Coriander	9.11	1.27	1.49	1.37	0.55	0.09
Fennel	0.98	1.48	0.27	1.51	0.93	0.03
Fenugreek	0.52	1.89	0.08	2.66	0.54	0.76
Garlic	**48.90**	**0.53**	**85.65**	**0.45**	**5.86**	**-0.08**
Ginger	1.10	1.53	1.69	1.55	5.15	0.02
Red Chilly	**37.42**	**25.13**	**9.06**	**25.26**	**0.81**	**0.11**
Turmeric	2.44	0.76	2.12	1.34	2.91	0.57
Uttar Pradesh	**100.00**	**7.11**	**100.00**	**1.79**	**3.35**	**-4.96**

The table 2.14 depicts the percentage share and CAGR of area, production and productivity of major spices crops during 2013-14 to 2017-18 in U.P. The triennium estimate 2018 shows highest area under garlic cultivation (48.90percent) followed by red chilly (37.48percent). The red chilly is the only spice crop which reported very significant growth in area under cultivation during 2014-18 with 25.13percent. The state average of growth is 7.11percent. A similar trend was seen for production of all spices crops as the Triennium estimate 2018 reported highest production of garlic (85.66percent) followed by red chilly cultivation with 9.6percent. The production growth rate 2014-18 is very significant only in red chilly (25.13percent) while growth rate in U.P. is only 1.79percent during the same period. Further table explains the Triennium estimate of productivity in 2018 which is highest for Garlic (5.86percent) and Ginger (5.15percent). The state average of major spice productivity is recorded at 3.35percent. The growth rate of productivity per hectare 2014-18 is not very encouraging whereas it is found to be highest 0.76percent in fenugreek followed by Turmeric (0.57percent) the productivity growth rate is found negative for garlic -0.08percent. The State average productivity is reported to be negative (-4.96percent), that can be due to variety of factors such as low fertility of soil, ultimate rain in major spices growing area, etc. Thus, various suggestions are required to improve the productivity in the given state.

VIII: Agro-climatic-Zone wise Status of all Horticulture Crops

The table 2.15 explains the share and growth rate of area, production and productivity of all horticulture crops on basis of agro climatic zone of Uttar Pradesh. The area of TE-2018

indicates that on basis of zones, zone 3 i.e. Central zones and zone 7 i.e. south west semi-arid zones has performed well than all other agro climatic zones with an increase of 29.75percent and 21.84percent respectively in area under all horticulture cultivation. On basis of growth rate of area zone 6 i.e. North-Eastern Plain Zone has highest growth rate. Zone 4, 5, 7 and 9 recorded the growth rate below state's average growth rate i.e. 5.1percent.

Table 2.15: Zone wise percent Share and CAGR of APY of Horticulture Crops for Uttar Pradesh during 2013-14 to 2017-18

Name of Zones	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Zone -1 Bhabhar and Tarai Zone	**2.68**	5.2	**2.92**	6.5	23.4	1.3
Zone-2 Bundelkhand Zone	**8.85**	5.7	**6.21**	7.6	16.1	1.7
Zone-3 Central Zone	**29.75**	5.8	**29.93**	10.6	20.8	4.6
Zone-4 Eastern Plain Zone	**11.04**	4.5	**10.15**	11.8	19.4	7.0
Zone-5 Mid-Western Plain Zone	**6.82**	4.6	**7.17**	5.8	22.2	1.1
Zone-6 North-Eastern Plain Zone	**9.24**	6.7	**10.47**	10.8	21.1	3.8
Zone-7 South-West Semi-Arid Zone	**21.84**	2.9	**23.55**	4.7	22.3	2.0
Zone-8 Vindhya Area	**1.35**	5.9	**1.06**	6.7	17.1	0.9
Zone-9 Western Plain Zone	**8.44**	4.4	**8.52**	7.0	22.5	2.5
Uttar Pradesh	**100.00**	**5.1**	**100.00**	**8.0**	**20.6**	**2.8**

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow&http://nhb.gov.in/Statistics.aspx?enc=K1SxiJnLqCTqPmc6tzC6mBuHmjyjK79Diz12BGKh5acu41PoHDv5hOakPtQZEaGJBUhkPLH24/5uwVKWN0rSKg==

TE 2018 (Prod.) suggests that Zone-3 Central zone has the best performance recording a production of 29.93percent followed by zone-7 (23.77percent). Growth rate wise (2014-18) zone 4 performed exceptionally well and recorded highest growth rate of 11.8percent followed by zone 6 (10.8percent) and zone-3 (10.6percent) where zone 1, 2, 4, 7, 8 and 9 recorded the growth rate below state average of 8percent.

In terms of productivity per hectare, the entire zone recorded a higher productivity than state average except zone 2 and zone 8. The growth rate figures for 2014-18 period shows that zone 4 (7.0percent) have been the best performance. The figures also reveal that barring zone 3, 4 and 6 all other zones reported lesser growth rate than state's average. It depicts that productivity of all horticulture crops in agro climatic zones of the state not showed better results as expected.

Table 2.16: Zone wise percent Share and CAGR of APY of All Fruits Crops for Uttar Pradesh during 2013-14 to 2017-18

Name of Zones	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Zone -1 Bhabhar and Tarai Zone	**3.9**	4.0	**4.03**	6.2	23.5	2.1
Zone-2 Bundelkhand Zone	**0.8**	4.9	**0.50**	8.1	14.5	2.9
Zone-3 Central Zone	**32.2**	5.1	**31.9**	7.0	24.1	1.8
Zone-4 Eastern Plain Zone	**10.2**	3.3	**8.19**	6.1	17.3	2.7
Zone-5 Mid-Western Plain Zone	**6.07**	2.7	**5.59**	3.8	20.0	1.0
Zone-6 North-Eastern Plain Zone	**18.3**	5.9	**24.2**	9.1	22.5	3.0
Zone-7 South-West Semi Arid Zone	**10.8**	1.0	**10.9**	5.1	23.4	5.0
Zone-8 Vindhya Area	**0.83**	4.1	**0.65**	4.6	17.4	0.4
Zone-9 Western Plain Zone	**16.9**	3.0	**13.9**	4.4	18.0	1.3
Uttar Pradesh	**100.0**	**3.8**	**100.0**	**6.0**	**20.1**	**2.3**

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow&http://nhb.gov.in/Statistics.aspx?enc=K1SxiJnLqCTqPmc6tzC6mBuHmjyjK79Diz12BGKh5acu41PoHDv5hOakPtQZEaGJBUhkPLH24/5uwVKWN0rSKg==

The above table 2.16 explains the zone wise percent share and growth rate of APY of all fruit crops for the state which clearly depicts that on basis of TE 2018 (area), central zone constitutes a major chunk of all fruit crops share(32.2percent) followed by zone 6 north Eastern Plain(18.3percent) and zone 9 i.e. western plain zone (16.9percent).The growth rate in area (2014-18) shows that except zone-4, zone-5, zone-7 and zone-9 ,the growth rate in all other zones was higher than state's average (3.8percent).

TE (Production) 2018 reported highest percentage share in zone-3 central zone (31.9percent) followed by zone-6 North Easter Plain Zone (24.2percent). The share of zone 4 and zone 8 is not much significant. The growth rate (2014-18) is highest in zone-6 (24.2percent) followed by zone-9 (13.9percent) The growth rate in production of all fruit crops in agro climatic zones where zone-5, zone-7, zone-8 and zone9- are below state average which is 6percent.

TE 2018 (Productivity per hector) is highest (24.1percent) in zone-3 central zone followed by 23.5percent in zone 1 i.e. Bhabhar and Terai zone. The productivity in zone-2, zone-4, zone-5, zone-8 and zone-9 is less than state average i.e. 2.3percent. The growth rate in productivity (2014-18) is found to be highest in zone-7 South West Semi-Arid Zone (5.0percent). The growth rate in zone-8 Vindhya Zone was recorded lowest in the state in all fruit crops.

Table 2.17: Zone wise percent Share and CAGR of APY of All Vegetables Crops for Uttar Pradesh during 2013-14 to 2017-18

Name of Zones	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Zone-1 Bhabhar and Tarai Zone	**2.20**	5.5	**2.51**	7.1	25.3	1.5
Zone-2 Bundelkhand Zone	**12.4**	5.9	**8.5**	7.8	17.0	1.7
Zone-3 Central Zone	**28.1**	6.5	**29.1**	12.5	22.0	5.8
Zone-4 Eastern Plain Zone	**11.7**	4.9	**10.9**	13.6	20.4	8.4
Zone-5 Mid-Western Plain Zone	**7.28**	5.9	**7.83**	7.0	23.1	1.1
Zone-6 North-Eastern Plain Zone	**6.09**	6.4	**5.20**	10.7	18.7	4.1
Zone-7 South-West Semi Arid Zone	**25.5**	5.0	**28.2**	4.8	24.0	-0.1
Zone-8 Vindhya Area	**1.51**	5.9	**1.23**	7.6	18.3	1.6
Zone-9 Western Plain Zone	**5.56**	6.5	**6.49**	10.3	25.4	3.5
Uttar Pradesh	**100.0**	**5.8**	**100.0**	**9.0**	**21.6**	**3.1**

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow&http://nhb.gov.in/Statistics.aspx?enc=K1SxiJnLqCTqPmc6tzC6mBuHmjyjK79Diz12BGKh5acu41PoHDv5hOakPtQZEaGJBUhkPLH24/5uwVKWN0rSKg==

TE-2018 indicate that Zone-3 Central Zone (28.1percent) followed by zone-7 South West Semi-Arid Zone constituted more than 50percent of area under vegetable crops in the state. The lowest share of area under vegetables in found in zone-8 Vindhya Zone. The growth rate in area under vegetable cultivation is higher than state average in all zones barring zone-1, zone-4 and zone-7.

TE 2018 (Production) reported highest production share in zone-3 central zone (29.1percent) followed by zone-7 South West Semi Arid Zone (28.2percent).The growth rate in production suggests that it is higher than state average in zone-3 Central zone, zone-4 Eastern plain zone, zone-6 North Eastern plain zone and zone-9 Western plain zone.

The productivity (TE-2018) is higher in all the zones than state average except zone-2 Bundelkhand zone, zone-6 North Eastern Plain zone and zone-8 Vindhya zone. The productivity growth rate (2014-18) has been highest in zone-4 Eastern plain zone (8.4percent) followed by zone-3 central zone (5.8percent). The zone-7 South west Semi-Arid zone reported a negative growth rate of 0.1percent. Hence, above table 2.17 depicts that zonal wise area and production of vegetable crops is much better in the state.

Table2.18: Zone wise percent Share and CAGR of APY of All Spices Crops for Uttar Pradesh during 2013-14

Name of Zones	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Zone-1Bhabhar and Tarai Zone	**2.41**	23.6	**1.15**	13.6	0.7	16.8
Zone-2 Bundelkhand Zone	**2.38**	11.9	**1.88**	11.8	0.4	11.3
Zone-3 Central Zone	**40.91**	10.0	**34.07**	5.6	2.1	6.9
Zone-4 Eastern Plain Zone	**5.60**	7.4	**2.87**	5.0	1.0	3.7
Zone-5 Mid-Western Plain Zone	**4.13**	9.4	**3.56**	6.0	1.6	1.8
Zone-6 North-Eastern Plain Zone	**3.71**	3.3	**2.40**	0.8	1.0	2.0
Zone-7 South-West Semi Arid Zone	**36.64**	8.2	**52.23**	5.6	4.1	5.1
Zone-8 Vindhya Area	**1.93**	18.1	**0.51**	16.7	0.5	18.1
Zone-9 Western Plain Zone	**2.30**	14.7	**1.33**	12.1	0.3	9.8
Uttar Pradesh	**100.0**	**11.8**	**100.0**	**8.6**	**1.3**	**8.4**

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow&http://nhb.gov.in/Statistics.aspx?enc=K1SxiJnLqCTqPmc6tzC6mBuHmjyjK79Diz12BGKh5acu41PoHDv5hOakPtQZEaGJBUhkPLH24/5uwVKWN0rSKg==

Table 2.18 explains the APY of all spices crops in agro climatic zones which explains that according to the area under triennium estimate 2018 shows that major chunk of share in area is claimed by zone-3 central zone (40.91percent) and zone-7 South West semi-Arid zone (36.64percent) where as growth rate 2014-18 (area) is highest in zone-1 Bhabhar and Terai zone (23.6percent) followed by zone-8 Vindhya Zone (18.1percent). Further, the table explains the TE-2018 (Production) of all spices crops which indicate the highest production share of zone-7 i.e. South west semi- Arid zone (52.23percent) followed by zone-3 central zone (34.07percent). The Highest growth rate in production (2014-18) is reported in zone-1 Bhabhar and Terai Zone (13.6percent) followed by zone-9 Western Plain zone (12.1percent). The Productivity (TE-2018) is found highest in zone-7 South West Semi Arid zone (4.1percent). Growth rate in productivity 2014-18 has been highest in zone-8 Vindhya zone (18.1percent) followed by zone-1 Bhabhar and Terai Zone (16.8percent). The growth rate is lowest in zone-5 Mid Western Main zone (1.8percent) as against state's average of 8.4percent.

IX: ZONAL DISTRICT WISE APY OF VARIOUS CROPS FOR U.P.

Table 2.19: District wise percent Share and CAGR of APY of Various Horticulture Crops for Uttar Pradesh in Zone -1 Bhabhar and Terai Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Bijnor	20.90	2.5	20.49	4.6	22.57	2.1
Moradabad	32.25	8.9	29.93	7.7	21.39	-1.1
Pilibhit	14.40	5.1	16.39	7.9	26.19	2.6
Rampur	32.46	4.2	33.19	6.1	23.53	1.8
Zone -1 Bhabhar and Terai Zone	100.00	5.2	100.00	6.5	23.4	1.3
	Total Fruits					
Bijnor	34.70	1.8	31.50	2.9	20.31	1.0
Moradabad	25.99	2.6	24.46	4.0	21.06	1.4
Pilibhit	12.65	8.4	16.83	13.1	29.78	4.4
Rampur	26.66	3.3	27.20	5.0	22.83	1.6
Zone -1 Bhabhar and Terai Zone	100.00	4.0	100.00	6.2	23.5	2.1
	Total Vegetables					
Bijnor	12.69	3.7	13.69	7.2	26.93	3.4
Moradabad	34.08	11.1	33.31	9.5	24.52	-1.4
Pilibhit	16.10	2.9	16.10	4.9	24.96	1.9
Rampur	37.13	4.4	36.90	6.6	24.80	2.1
Zone -1 Bhabhar and Terai Zone	100.00	5.5	100.00	7.1	25.3	1.5
	Total Spices					
Bijnor	0.53	16.6	0.27	4.1	0.80	-10.7
Moradabad	68.44	24.2	37.85	21.4	1.29	24.2
Pilibhit	7.47	42.8	17.87	25.8	0.14	42.8
Rampur	23.57	10.8	44.01	3.0	0.45	10.8
Zone -1 Bhabhar and Terai Zone	100.00	23.6	100.00	13.6	0.7	16.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow.

The table 2.19 explains the districts wise percent share and growth rate of APY of various horticulture crops for U.P in zone 1-Bhabhar and Terai zone. It explains the area, production and productivity of total horticulture crops in districts of zone 1 .It shows that Rampur and Moradabad claimed more than 64percent area of total horticulture((total area under TE-2018 in zone 1). The growth rate in area is found to be highest in Moradabad (8.9percent). TE 2018 (Production) indicates that Rampur is a major contributor (33.19percent) followed by Moradabad (29.93percent). The Growth rate of production is most significant in Pilibhit (7.9percent) followed by Moradabad (7.7percent). TE-2018 (Productivity) shows Pilibhit

(26.19percent) as the major contributor of productivity in the zone 1 while the growth rate during 2014-18 recorded a negative growth rate of -1.1percent in Moradabad.

The table also explains the District wise percent Share and CAGR of APY of All Fruit, vegetables and total spices Crops for Uttar Pradesh in Zone-1 during 2013-14 to 2017-18.It was found that Bijnor claimed highest (34.70percent) share while Pilibhit claimed highest growth rate of 8.4percent in area under total fruits. Pilibhit claimed highest (31.50percent) share in production while growth rate is highest (13.1percent) during 2014-18. The productivity (TE-2018) and growth rate during 2014-18 has been highest in Pilibhit.

TE 2018 (area) and growth rate (2014-18) is found to be highest in Moradabad (34.8percent and 11.1percent respectively) under total vegetables. TE-2018 (Production) is highest in Rampur (36.9percent) while growth rate 2014-18 is found to be highest in Moradabad (9.5percent). TE 2018 (Production) and productivity per hectare is found to be highest in Bijnor which is 26.93percent and 3.4percent respectively.

TE-2018 (area) has been found to be highest in Moradabad (68.44percent) under total spices crops while growth rate 2014-18 has been highest in Pilibhit with 42.8percent. TE 2018 (Production) is found to be highest in Rampur (44.01percent) while growth rate (2014-2018) was highest in Pilibhit (25.8percent). TE-2018 (productivity MT per hectare) for total spices in zone 1 districts was recorded highest in Moradabad (1.29) and growth rate is found to be highest in Pilibhit (42.8percent) where Bijnor reported a negative growth rate in productivity (-10.7percent).

Table 2.20: District wise percent Share and CAGR of APY of Various Horticulture Crops for Uttar Pradesh in Zone-2 Bundelkhand Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Banda	2.52	5.1	3.49	7.6	20.56	2.4
Chitrakoot	1.94	9.2	2.71	11.1	20.70	1.7
Hamirpur	5.25	6.8	5.47	8.3	15.45	1.4
Jalaun	35.21	5.0	35.70	7.1	15.04	2.0
Jhansi	22.70	5.0	23.36	7.2	15.24	2.1
Lalitpur	22.62	4.6	21.43	6.2	14.05	1.6
Mahoba	9.75	4.5	7.85	5.6	11.93	1.1
Zone-2 Bundelkhand Zone	100.00	5.7	100.00	7.6	16.1	1.7
	Total Fruits					
Banda	14.49	3.2	13.57	4.8	13.69	1.5
Chitrakoot	16.05	3.4	9.99	3.7	9.11	0.3
Hamirpur	8.16	3.2	6.42	3.8	11.50	0.6
Jalaun	5.95	11.8	8.18	28.1	20.10	14.5

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Jhansi	17.23	5.5	23.97	5.9	20.36	0.4
Lalitpur	31.45	3.8	32.37	4.6	15.05	0.8
Mahoba	6.67	3.4	5.50	5.8	12.05	2.3
Zone-2 Bundelkhand Zone	100.00	4.9	100.00	8.1	14.5	2.9
	Total Vegetables					
Banda	2.22	5.5	3.26	7.9	22.06	2.3
Chitrakoot	1.57	10.3	2.55	11.8	24.24	1.4
Hamirpur	5.01	6.6	5.45	8.4	16.32	1.7
Jalaun	36.17	5.0	36.39	7.1	15.08	2.0
Jhansi	23.03	5.0	23.37	7.2	15.20	2.1
Lalitpur	22.15	4.7	21.06	6.3	14.25	1.6
Mahoba	9.87	4.4	7.91	5.6	12.02	1.1
Zone-2 Bundelkhand Zone	100.00	5.9	100.00	7.8	17.0	1.7
	Total Spices					
Banda	4.19	3.6	1.63	3.2	1.03	-0.4
Chitrakoot	5.10	22.7	1.54	23.1	0.10	22.7
Hamirpur	20.10	15.6	5.97	16.9	0.37	15.6
Jalaun	12.76	23.6	4.06	23.4	0.24	23.6
Jhansi	6.87	0.9	10.19	1.6	0.13	0.9
Lalitpur	44.60	2.8	74.81	1.5	0.83	2.8
Mahoba	6.39	14.0	1.81	13.1	0.12	14.0
Zone-2 Bundelkhand Zone	100.00	11.9	100.00	11.8	0.4	11.3

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow.

The above table 2.20 explains the district wise percent share and growth rate of APY of various horticulture crops for U.P in Bundelkhand zone .It explains the total horticulture which shows that in TE 2018 the highest share of percentage area in claimed by Jalaun while growth rate in area during 2014-18 is reported highest in Chitrakoot. The same trend is found in production (TE-2018) which was found highest in Jalaun followed by Chitrakoot. TE-2018 (Productivity) is highest in Chitrakoot and growth rate (2014-18) is reported in highest Banda. This shows that Jalaun district has highest area and production in Bundelkhand zone.

Further, the table explains total fruit crops in zone 2 which depicts that according to Growth rate 2014-18, area and production and productivity, the percentage is highest in Jalaun district among all other district in zone 2.

TE-2018 (area) is highest is Jalaun while growth rate 2014-18 (area) is highest in Chitrakoot under total vegetables crops in Bundelkhand zone. Same trend is found in terms of production where Jalaun is at top in terms of production share (36.39) while growth rate is

highest in Chitrakoot (11.1percent). In terms of productivity Chitrakoot tops the zone while Jhansi led the way in growth rate (2.1percent).

Further the table depicts that Lalitpur reported highest percent (44.60percent) of area while Jalaun (23.6percent) claimed highest rate of growth in the zone. Production wise Lalitpur (74.81percent) recorded highest percentage while Jalaun (23.4percent) led the way in terms of growth. Productivity per hectare) is highest in Lalitpur (0.83percent) and productivity growth was most significant in Chitrakoot. Hence, the above table explains that Jalaun district led the way in all aspects of various horticulture crops.

Table 2.21: District wise percent Share and CAGR of APY of All Horticulture Crops for Uttar Pradesh in Zone-3 Central Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Allahabad	5.70	3.6	4.89	16.5	18.18	12.5
Amethi	3.38	4.3	3.12	8.5	19.58	3.9
Auraiya	2.18	3.3	2.18	3.8	21.19	0.5
Etawah	4.94	3.2	5.15	7.6	22.14	4.2
Farrukhabad	11.06	3.3	13.19	6.9	25.33	3.6
Fatehpur	7.48	13.0	7.19	13.1	20.48	0.1
Hardoi	5.69	6.0	5.64	10.5	21.01	4.2
Kannauj	12.34	3.2	14.26	9.0	24.54	5.7
Kanpur Dehat	2.33	5.9	2.15	9.1	19.61	3.1
Kanpur Nagar	6.26	9.2	5.42	17.9	18.30	7.9
Kaushambi	3.82	10.0	4.83	16.6	26.86	6.0
Kheri	2.66	9.0	2.90	11.2	23.17	2.0
Lucknow	9.06	4.6	9.07	8.1	21.26	3.4
Pratapgarh	5.80	2.5	3.70	7.2	13.56	4.6
Rae Bareli	2.83	7.0	2.63	18.3	19.69	10.5
Sitapur	5.47	3.9	4.07	7.6	15.79	3.6
Unnao	8.98	6.2	9.62	9.0	22.73	2.6
Zone-3 Central Zone	100.00	5.8	100.00	10.6	20.8	4.6

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.21 explains the percent share and growth rate of APY of total horticulture crops in Central zone. It exhibits that the percentage area (TE-2018) is highest in Kannauj (12.34percent) followed by Farukhabad (11.06percent) while Fatehpur ranked first and Kaushambi second in terms of growth in area (2014-18). Percent wise production (TE-2018) is highest in Kannauj (14.26percent) and growth rate (2014-18) in production is significantly higher in Raebareli (18.3percent), Kanpur Nagar (17.9), Kaushambi (16.6percent) and Allahabad (16.5) than the State average of 10.6percent. The productivity per hectare (TE-2018) is significantly higher in Kaushambi (20.8percent), Farukhabad (25.33percent),

Kaunnaj (24.54percent) and Kheri (23.17) than state average (20.8percent). The growth rate in productivity has been very impressive in Allahabad (12.5percent), Raebareli, Kanpur Nagar (7.9percent) and Kaushambi (6percent). Thus, area, production and its productivity of total horticulture crops in zone 3, Central Zone is better.

Table 2.22: District wise percent Share and CAGR of APY of All Fruit Crops for Uttar Pradesh in Zone-3 Central Zone during 2013-14 to 2017-18

Districts	Total Fruit Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Allahabad	3.63	3.9	2.84	6.7	17.13	2.7
Amethi	3.01	2.1	2.41	3.3	17.52	1.2
Auraiya	0.35	3.6	0.39	3.9	24.48	0.3
Etawah	0.59	4.5	0.81	4.7	29.87	0.2
Farrukhabad	6.03	4.5	7.24	6.0	26.27	1.4
Fatehpur	6.60	13.7	11.90	16.9	39.46	2.8
Hardoi	4.67	2.4	4.00	3.9	18.76	1.5
Kannauj	1.43	4.8	2.01	5.3	30.63	0.5
Kanpur Dehat	0.53	6.5	0.59	8.0	24.32	1.4
Kanpur Nagar	2.27	3.6	2.38	4.1	22.86	0.5
Kaushambi	7.40	12.0	11.89	16.3	35.14	3.9
Kheri	4.25	5.5	5.00	9.8	25.72	4.0
Lucknow	20.91	2.3	20.11	4.1	21.03	1.7
Pratapgarh	12.35	2.2	6.41	2.5	11.34	0.3
Rae Bareli	0.85	10.7	1.19	15.5	30.50	4.4
Sitapur	11.59	2.2	6.94	4.6	13.09	2.3
Unnao	13.56	2.4	13.90	3.7	22.40	1.3
Zone-3 Central Zone	100.00	5.1	100.00	7.0	24.1	1.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.22 indicates that Lucknow (20.91percent) has a highest percentage area (TE-2018) followed by Unnao (13.56). The highest growth rate in area (2014-18) is seen in Fatehpur (13.7percent) followed by Kaushambi (12.0percent). The highest production share (TE-2018) is claimed by Lucknow (22.11percent) while growth rate in production (2014-18) is highest in Fatehpur (16.9percent) followed by Kaushambi (16.3percent) and Raebareli (15.5percent). Productivity per hectare (TE 2018) is very significant in Fatehpur (39.46percent), Kaushami (35.14), Kannuj (30.63percent) and Rae Bareli (30.50percent). Rae

Bareli (4.4percent) and Kheri performed extremely well in terms of growthrate in productivity during 2014-18.

Table 2.23: District wise percent Share and CAGR of APY of All Vegetable Crops for Uttar Pradesh in Zone-3 Central Zone during 2013-14 to 2017-18

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Allahabad	7.07	3.3	5.81	18.8	18.62	15.0
Amethi	3.80	5.1	3.45	10.2	20.56	4.9
Auraiya	2.29	4.2	2.74	4.1	27.15	-0.1
Etawah	5.98	3.6	6.72	8.1	25.50	4.3
Farrukhabad	13.78	3.0	15.77	7.2	25.96	4.0
Fatehpur	6.49	12.0	5.13	10.1	18.09	-1.7
Hardoi	6.27	6.8	6.37	12.4	22.99	5.3
Kannauj	17.76	3.1	19.52	9.3	24.92	5.9
Kanpur Dehat	2.81	6.2	2.82	9.3	22.76	2.9
Kanpur Nagar	7.58	8.9	6.74	20.4	20.01	10.6
Kaushambi	2.32	6.8	1.87	17.3	18.14	9.9
Kheri	1.92	11.9	2.02	12.7	23.95	0.7
Lucknow	4.54	9.7	4.46	17.3	22.16	6.9
Pratapgarh	3.42	2.9	2.58	12.8	17.14	9.6
Rae Bareli	3.55	6.2	3.25	18.8	20.66	11.9
Sitapur	3.08	6.9	2.88	10.9	21.18	3.8
Unnao	7.34	9.2	7.88	13.5	24.33	4.0
Zone-3 Central Zone	100.00	6.5	100.00	12.5	22.0	5.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.23 explains that Kannauj (17.76percent) and Farukhabad (13.78percent) shared the major chunk in percentage area (TE 2018) in zone 3 while in terms of growth rate in area (2014-18), Fatehpur (12.0percent) and Kheri (11.19percent) did extremely well. Further, Kannauj (19.52percent) followed by Farukhabad commanded the higher percentage in its production (TE-2018). Production growth rate (2014-18) is highest in Kanpur Nagar (20.4percent) followed by Allahabad (18.8percent) and Rae Bareli (18.8percent). Productivity per hectare TE-2018 is seen highest in Allahabad followed by Rae Bareli (11.9percent) and Kanpur Nagar (10.6percent). The overall percentage area of total vegetable crops is 6.5percent and the growth rate of production is 12.5percent.

Table 2.24: District wise percent Share and CAGR of APY of All Spice Crops for Uttar Pradesh in Zone-3 Central Zone during 2013-14 to 2017-18

Districts	Total Spices Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Allahabad	0.90	20.4	0.36	13.3	1.12	-5.9
Amethi	0.59	16.0	0.30	8.0	1.42	-6.9
Auraiya	9.77	1.1	19.58	0.4	5.58	-0.7
Etawah	14.39	1.3	28.78	0.4	4.60	1.3
Farrukhabad	5.83	4.1	9.66	0.9	1.87	4.1
Fatehpur	22.44	15.2	12.28	7.2	7.18	15.2
Hardoi	4.32	15.4	2.28	7.9	1.38	15.4
Kannauj	5.87	2.7	10.62	0.7	1.88	2.7
Kanpur Dehat	5.78	3.7	2.21	2.7	1.85	3.7
Kanpur Nagar	10.99	20.1	3.65	16.3	3.52	20.1
Kaushambi	2.93	17.6	1.43	9.0	0.94	17.6
Kheri	3.08	14.3	1.55	8.9	0.98	14.3
Lucknow	1.35	3.8	1.45	1.1	0.43	3.8
Pratapgarh	0.21	1.2	0.12	1.0	0.07	1.2
Rae Bareli	4.44	11.9	2.13	6.3	1.42	11.9
Sitapur	2.15	3.2	1.28	1.6	0.69	3.2
Unnao	4.94	17.1	2.30	9.5	1.58	17.1
Zone-3 Central Zone	100.00	10.0	100.00	5.6	2.1	6.9

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Table 2.24 reveals the APY of total spices crops in Central Zone .It depicts that Fatehpur (22.44percent) tops in terms of percentage area (TE 2018) followed by Etawah (14.39percent) .The growth rate in area during 2014-18 is reported to be highest in Allahabad (20.4percent) followed by Kanpur Nagar (20.1percent) and Kaushambi (17.6percent). Kannuaj district has not shown much improvement in area under total spices crops. Further, the production share (TE 2018) is highest in Etawah (28.78percent) and 19.8percent in Auraiya. The growth rate in production (2014-18) is found highest in Kanpur Nagar (16.3percent) followed by Allahabad (13.3percent). Productivity per hectare (TE 2018) is very significant in Fatehpur (7.18percent) whereas the productivity growth rate is highest in Kanpur Nagar followed by Kaushambi (17.6percent). It is noteworthy that Allahabad, Amethi and Auraiya recorded a negative growth rate in productivity during the same period. The above table reveals that Kannauj district in central zone has not played a very significant role in the production of spices.

Table 2.25: District wise percent Share and CAGR of APY of All Horticulture Crops for Uttar Pradesh in Zone-4 Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Ambedkar Nagar	9.18	4.1	9.26	8.7	19.58	4.4
Azamgarh	8.55	3.3	6.59	15.8	14.95	12.0
Ballia	10.94	3.9	9.74	17.3	17.25	12.9
Barabanki	15.09	4.6	15.25	9.0	19.61	4.2
Chandauli	1.48	3.7	1.72	7.8	22.56	3.9
Faizabad	11.50	6.8	13.52	11.3	22.81	4.3
Ghazipur	10.56	4.6	11.85	8.6	21.77	3.8
Jaunpur	10.34	3.3	10.24	19.9	19.19	16.0
Mau	2.05	3.9	1.69	15.7	16.03	11.4
Sultanpur	13.80	3.2	13.01	6.7	18.30	3.4
Varanasi	6.51	8.3	7.15	8.8	21.33	0.5
Zone-4 Eastern Plain Zone	100.00	4.5	100.00	11.8	19.4	7.0

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Above table 2.25 explains the district wise percent share and CAGR of APY of all horticulture crops in Eastern Plain Zone where it is clear from the table cited that highest percentage share of area (TE 2018) of all horticulture crops is highest in Barabanki followed by Sultanpur while the highest growth rate in area is found in Varanasi. Production share (TE 2018) is most significant in Barabanki followed by Faizabad (13.52percent) and Sultanpur (13.01percent). Growth rate in production (2014-18) is highest in Jaunpur and 17.3percent in Ballia. Productivity per hectare 2014-18 is higher in Faizabad (22.81percent), Chandauli (22.56percent), Ghazipur (21.77percent), Ambedkar Nagar (19.58percent), Barabanki (19.6percent) and Jaunpur (19.19percent) than zone average of 19.4. Growth rate in productivity (2014-18) is most significant in Jaunpur (11.4percent).

Table 2.26: District wise percent Share and CAGR of APY of All Fruit Crops for Uttar Pradesh in Zone-4 Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Fruit Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Ambedkar Nagar	11.23	2.0	10.97	3.4	17.33	1.4
Azamgarh	6.50	2.5	4.94	3.7	13.47	1.2
Ballia	11.58	3.1	11.16	5.4	17.11	2.3
Barabanki	11.17	3.1	10.95	6.1	17.40	3.0
Chandauli	0.40	2.9	0.35	3.9	15.30	0.9
Faizabad	17.93	2.8	22.04	4.7	21.83	1.9
Ghazipur	6.64	2.3	6.26	3.4	16.72	1.1
Jaunpur	5.94	2.1	5.52	3.5	16.49	1.3
Mau	1.26	3.0	1.15	5.7	16.24	2.6
Sultanpur	22.12	2.3	20.09	4.0	16.12	1.7
Varanasi	5.22	10.1	6.57	23.1	22.33	11.8
Zone-4 Eastern Plain Zone	100.00	3.3	100.00	6.1	17.3	2.7

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.26 explains the percentage share in area (TE 2018) which is most convincing in Sultanpur (22.12percent) and Faizabad (17.93percent) while Varanasi has done extremely well in terms of growth in area during 2014-18 in all total fruit crops in Eastern Plain Zone. This reveals that Sultanpur has abundant area for fruit crops. Further, production (TE 2018) is highest in Faizabad (22.04percent) followed by Sultanpur (20.9percent) while Varanasi (23.01percent) led the way in terms of growth rate during 2004-18. The productivity per hectare is found to be higher in Faizabad, Barabanki and Ambedkar than the total zone average. Sultanpur has 16.12percent productivity than the total zone average productivity. The growth rate in productivity is highest in Varanasi (11.8percent) during 2014-18.

Table 2.27: District wise percent Share and CAGR of APY of All Vegetable Crops for Uttar Pradesh in Zone-4 Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Ambedkar Nagar	8.56	5.0	8.76	10.8	20.99	5.5
Azamgarh	9.43	3.5	7.08	18.7	15.38	14.7
Ballia	10.80	4.0	9.32	22.4	17.66	17.7
Barabanki	15.67	4.7	16.43	9.6	21.50	4.7
Chandauli	1.89	3.8	2.12	8.0	23.08	4.1
Faizabad	9.52	9.7	11.04	15.9	23.76	5.6
Ghazipur	11.77	4.7	13.48	9.4	23.46	4.5
Jaunpur	12.09	3.5	11.63	22.8	19.68	18.6
Mau	2.36	4.1	1.85	17.8	16.05	13.2
Sultanpur	11.31	3.8	10.98	8.2	19.91	4.3
Varanasi	6.60	7.0	7.31	6.1	22.75	-0.9
Zone-4 Eastern Plain Zone	100.00	4.9	100.00	13.6	20.4	8.4

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.27 reveals that area (TE-2018) is highest in Barabanki (15.67percent) followed by Jaunpur (12.09percent) and Sultanpur. The growth rate in area under total vegetable crops in Zone 4 is highest in Faizabad (9.7percent) followed by Varanasi (7percent) and Ambedkar Nagar (5percent) during 2014-18. The production share (TE-2018) is highest in Barabanki (16.43percent) while growth rate in production is highest in Jaunpur (22.8percent) followed by Ballia (22.4percent) during 2004-18. The productivity per hectare TE-2018 is almost same in three districts namely Faizabad (23.76), Ghazipur (23.46percent) and Chandauli (23.08percent). The productivity growth rate is highest in Jaunpur (18.6percent) followed by Ballia (17.7percent) but Varanasi reported a negative growth rate (-0.9percent) during 2014-18. The productivity of Sultanpur district in selected zone has not shown much improvement in total vegetable crops.

Table 2.28: District wise percent Share and CAGR of APY of All Spice Crops for Uttar Pradesh in Zone-4 Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Spices Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Ambedkar Nagar	6.98	4.2	9.27	1.7	2.28	-2.4
Azamgarh	2.40	2.3	3.43	1.4	2.45	-0.9
Ballia	8.55	11.2	11.04	3.7	2.21	-6.8
Barabanki	39.44	8.5	41.39	3.8	1.80	-4.3
Chandauli	0.00	0.00	0.00	0.00	0.00	0.00
Faizabad	5.62	1.4	13.44	0.4	0.25	1.4
Ghazipur	13.66	22.8	7.75	16.9	0.60	22.8
Jaunpur	1.25	0.9	1.36	0.8	0.06	0.9
Mau	0.30	0.0	0.16	0.0	0.01	0.0
Sultanpur	4.12	6.6	3.61	3.1	0.18	6.6
Varanasi	17.69	23.7	8.56	22.8	0.78	23.7
Zone-4 Eastern Plain Zone	100.00	7.4	100.00	5.0	1.0	3.7

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

As is evident from the table 2.28 that the percentage area (TE 2018) is highest in Barabanki (39.44percent) followed by Varanasi (17.69percent) while growth rate in area (2014-18) is highest in Varanasi (23.7percent) followed by Ghazipur (22.8percent) with a growth rate of 7.4percent of total spices crops area in **Eastern Plain Zone** . Similar trend has been found in production share (TE 2018) which is highest for Barabanki (41.39percent) while the growth rate (2014-18) is highest in Varanasi (22.8percent). The productivity per hectare (TE 2018) is

highest in Azamgarh (2.45percent) followed by Ambedkar Nagar (2.28percent). Productivity Growth rate (2014-18) is highest in Varanasi (23.7percent) followed by Ghazipur (22.8percent).It is to be noted that Ambedkar Nagar, Azamgarh, Ballia and Azamgarh recorded negative growth rate in productivity during the same period. The overall productivity of total spices crops in eastern plain zone is just 3.7percent from an area of 7.4percent in the state.

Table 2.29: District wise percent Share and CAGR of APY of Various Horticulture Crops for Uttar Pradesh in Zone-5 Mid-Western Plain Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Amroha	17.83	6.4	17.12	5.8	21.34	-0.6
Bareilly	15.58	4.1	14.68	4.2	20.94	0.1
Budaun	31.12	3.6	30.07	7.8	21.46	4.1
Sambhal	13.91	5.0	13.75	12.0	21.88	6.7
Shahjahanpur	21.56	4.0	24.38	-1.0	25.20	-4.8
Zone-5 Mid-Western Plain Zone	100.00	4.6	100.00	5.8	22.2	1.1
	Total Fruits					
Amroha	36.75	1.9	39.18	3.0	21.67	1.0
Bareilly	18.96	2.5	17.38	3.5	18.63	1.0
Budaun	23.98	4.2	23.66	5.6	20.06	1.4
Sambhal	9.96	2.7	11.69	3.6	23.85	0.9
Shahjahanpur	10.34	2.2	8.10	3.1	15.93	1.0
Zone-5 Mid-Western Plain Zone	100.00	2.7	100.00	3.8	20.0	1.0
	Total Vegetables					
Amroha	12.30	11.5	11.07	8.9	21.19	-2.3
Bareilly	14.67	4.8	13.96	4.4	22.39	-0.3
Budaun	32.77	3.5	31.73	8.4	22.75	4.8
Sambhal	14.93	5.3	14.29	14.3	22.40	8.5
Shahjahanpur	25.33	4.2	28.96	-1.3	27.00	-5.3
Zone-5 Mid-Western Plain Zone	100.00	5.9	100.00	7.0	23.1	1.1
	Total Spices					
Amroha	2.45	23.6	0.68	23.7	0.80	0.1
Bareilly	10.69	3.9	8.93	-0.1	2.41	-3.9
Badaun	48.94	3.2	58.40	-0.5	3.45	-3.6
Sambhal	20.92	10.6	21.62	4.0	0.68	10.6
Shahjahanpur	17.01	6.0	10.38	2.7	0.55	6.0
Zone-5 Mid-Western Plain Zone	100.00	9.4	100.00	6.0	1.6	1.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udyan Bhawan, 2-Sapru Marg, Lucknow.

The table 2.29 explains the district wise percent share and growth rate of various horticulture crops in Mid-Western Plain Zone where firstly it indicate the total percentage of horticulture crops area (TE 2018) which is found highest for Badaun (31.12percent) while growth rate (2014-18) is above zone average in Amroha (6.4percent) and Sambhal (5.0percent). The Production share (TE 2018) is found to be highest in Badaun. The growth rate (2014-18) is highest in Sambhal. Productivity per hectare (TE-2018) is highest in Shahjahanpur (25.20percent) while growth rate in productivity is highest in Sambhal (6.7percent) during 2014-18 for total horticulture crops in zone 5.

Further, it explains the Total Fruit crops in zone 5 where it was depicted that Amroha (36.75percent) recorded highest share in area (TE 2018) while growth rate is found highest in Badaun (4.2percent) during 2014-18 under total fruit crops. Shahjahanpur has shown much improvement in production as percentage of fruit crop is very near to total fruit crop production in **Mid-Western Plain Zone** zone.

In terms of production share (TE 2018) Amroha (39.18percent) topped the zone while Badaun recorded highest rate of growth (5.6percent) during 2014-18. The productivity per hectare (TE-2018) is found to be highest in Sambhal (23.85percent) while growth rate is found highest in Badaun (1.4percent) during 2014-18.

Further, the figures given in table indicates that share of area (TE 2018) under total vegetable crops is highest in Badaun (32.77percent) while growth rate in area is higher only in Amroha (11.5percent) than zone average of 5.9percent during 2014-18. The production share (TE-2018) is highest in Badaun (31.73percent) followed by Shahjahanpur (28.96percent). The growth rate in production is highest in Sambhal (14.3percent) and negative in Shahjahanpur (-1.3percent) which shows that production of vegetable crops in particular district has not shown much improvement in the selected zone. The productivity growth rate is highest in Sambhal (8.5percent) under total vegetable crops during 2014-18 while Amroha, Barelly and Shahjahanpur recorded negative growth in productivity during the same period.

Further, the share of area (TE 2018) and production (TE 2018) of total spice crops in zone 5 is highest in Badaun (48.94percent and 58.40percent respectively) while growth rate in area and production highest in Amroha during the same period. Productivity per hectare is highest in Badaun (3.45percent) and growth rate (2014-18) is highest in Sambhal (10.6percent) where Shahjahanpur shows highest percentage in spice crops (6.0percent) than overall total zonal percentage of spice crops.

Table 2.30: District wise percent Share and CAGR of APY of All Horticulture Crops for Uttar Pradesh in Zone-6 North-Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Bahraich	9.76	9.9	9.57	12.2	23.47	2.1
Balrampur	3.77	3.7	3.10	7.4	19.71	3.5
Basti	8.42	5.0	5.53	8.7	15.72	3.4
Deoria	5.28	3.1	3.31	8.0	15.00	4.7
Gonda	9.63	10.5	7.74	14.2	19.23	3.4
Gorakhpur	21.26	10.3	28.01	15.5	31.52	4.7
Kushi Nagar	16.92	11.1	22.00	16.0	31.12	4.4
Maharajganj	10.27	7.6	10.56	15.3	24.59	7.1
Sant Kabeer Ngr	7.39	4.8	5.17	7.8	16.74	2.9
Shravasti	2.28	5.1	2.00	8.8	21.00	3.5
Siddharth Nagar	5.04	3.0	3.01	5.4	14.27	2.3
Zone-6 North-Eastern Plain Zone	100.00	6.7	100.00	10.8	21.1	3.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Figures given in table 2.30 shows that area (TE-2018) in total horticulture crops is highest in Gorakhpur (21.26percent) while growth rate (2014-18) is highest in Kushinagar (11.11percent) followed by Gonda (10.5percent) and Gorakhpur (10.3percent). The production share is highest in Gorakhpur (28.01percent) followed by Kushinagar (22.0percent) while growth rate is highest in Kushinagar (16.0percent) followed by Gorakhpur (15.5percent) and Maharajganj (15.3percent) during 2014-18. The productivity per hectare (TE-2018) in highest in Gorakhpur (31.52percent) followed by Kushinagar (22.0percent) while growth rate is highest in Kushinagar (16.0percent) followed by Gorakhpur (15.5percent) and Maharajganj (15.3percent) during 2014-18. The productivity per hectare (TE-2018) is highest in Gorakhpur (31.52) followed by Kushinagar (31.12percent) while growth rate in productivity is highest in Maharajganj (7.1percent) during 2014-18. Thus, Gorakhpur has been the highest district in terms of area, production and productivity in total horticulture crops in North Eastern Plain Zone.

Table 2.31: District wise percent Share and CAGR of APY of All Fruit Crops for Uttar Pradesh in Zone-6 North-Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Fruit Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Bahraich	7.92	8.3	8.34	12.3	30.74	3.7
Balrampur	2.72	3.8	1.94	7.1	20.84	3.2
Basti	6.28	2.5	3.18	4.1	14.79	1.6
Deoria	4.71	2.0	1.74	3.5	10.78	1.4
Gonda	2.99	2.4	1.54	4.6	14.99	2.1
Gorakhpur	28.28	13.3	35.52	17.0	36.65	3.2
Kushi Nagar	23.95	12.6	29.22	16.8	35.59	3.8
Maharajganj	11.76	9.5	11.28	15.7	27.98	5.6
Sant Kabir Nagar	6.42	4.2	4.37	8.1	19.85	3.8
Shravasti	1.89	3.5	1.30	7.0	20.09	3.3
Siddharth Nagar	3.09	2.2	1.58	4.0	14.94	1.8
Zone-6 North-Eastern Plain Zone	100.00	5.9	100.00	9.1	22.5	3.0

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Figures in table 2.31 indicates that percentage area (TE-2018) and growth rate (2014-18) is most significant in Gorakhpur. Gorakhpur and Kushingar constitutes more than 64percent share in production (TE-2018). The growth rate in production is also most significant in the same two districts of the zone. Productivity per hectare (TE 2018) is seen most significant in the same two districts of Gorakhpur and Kushinagar. The growth rate in productivity in highest in Maharajganj (5.6percent) during 2014-18. This reveals that Gorakhpur district has maximum area and production in total fruit crops in zone 6.

Table 2.32: District wise percent Share and CAGR of APY of All Vegetable Crops for Uttar Pradesh in Zone-6 North-Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Bahraich	10.85	11.3	11.69	12.3	20.15	0.9
Balrampur	5.05	3.8	5.21	7.6	19.24	3.7
Basti	11.10	6.9	9.80	11.7	16.48	4.5
Deoria	6.14	4.2	6.17	10.5	18.77	6.1
Gonda	17.49	12.5	18.99	15.9	20.27	3.0

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Gorakhpur	13.92	4.3	14.52	10.0	19.47	5.5
Kushi Nagar	8.32	8.2	8.87	12.0	19.93	3.5
Maharajganj	8.90	4.9	9.29	14.5	19.49	9.1
Sant Kabeer Ngr	8.43	4.9	6.63	7.5	14.68	2.5
Shravasti	2.77	6.5	3.27	10.2	22.06	3.5
Siddharth Nagar	7.03	3.5	5.56	6.1	14.77	2.5
Zone-6 North-Eastern Plain Zone	100.00	6.4	100.00	10.7	18.7	4.1

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The table 2.32 shows that percentage area (TE-2018) is highest in Gonda (17.49percent) and growth rate in area (2014-18) is also highest in Gonda (12.5percent) followed by Gorakhpur (13.92percent) in the zone. The position of production share (TE 2018) and growth rate (2014-18) is again highest in Gonda (18.99percent and 15.9percent respectively). The productivity per hectare (TE-2018) is highest in Shravasti (22.06percent) while growth rate is highest in Maharajganj (9.1percent) during 2014-18. The growth rate productivity of total vegetable crops in Gorakhpur is seen higher than the overall productivity in the zone.

Table 2.33: District wise percent Share and CAGR of APY of All Spice Crops for Uttar Pradesh in Zone-6 North-Eastern Plain Zone during 2013-14 to 2017-18

Districts	Total Spices Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Bahraich	36.69	9.5	33.11	3.0	1.95	-6.0
Balrampur	2.00	0.0	4.05	0.2	4.39	0.2
Basti	3.21	-0.1	4.41	0.3	2.98	0.4
Deoria	0.31	0.0	0.62	0.0	0.01	0.0
Gonda	5.45	2.1	7.28	0.6	0.16	2.1
Gorakhpur	0.34	-7.6	0.19	-16.6	0.01	-7.6
Kushi Nagar	28.29	1.4	35.77	1.5	0.82	1.4
Maharajganj	1.00	7.2	0.43	6.3	0.03	7.2
Sant Kabeer Ngr	9.61	17.2	4.84	12.8	0.28	17.2
Shravasti	1.28	5.9	1.08	0.7	0.04	5.9
Siddharth Nagar	11.83	1.1	8.21	0.5	0.34	1.1
Zone-6 North-Eastern Plain Zone	100.00	3.3	100.00	0.8	1.0	2.0

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Table 2.33 indicates that percentage area (TE 2018) is highest in Baharaich (36.69percent) followed by Kushi Nagar (28.29percent). These two districts contribute more than 64percent area under all spice crops in the zone. The growth rate in area is highest in Sant Kabirnagar

(17.2percent) during 2014-18. The growth rate in area is above zone average only in four districts namely, Bahraich, Mahrajganj, Sant Kabeer Nagar and Shravasti whereas it is important to notice that Gorakhpur and Basti reported even negative growth rate in area. In terms of production share (TE-2018) Kushi Nagar (35.77percent) and Bahraich (33.11percent) constituted more than 68percent production. Productivity per hectare (TE 2018) is higher than zone average (1.00percent) only in 3 districts namely Balrampur (4.39percent), Basti (2.98percent) and Bahraich (1.95percent).The growth rate in productivity is highest in Sant Kabir Nagar (17.2percent) while Gorakhpur (-7.6percent) and Bahraich (-6.0percent) reported significantly higher negative growth rate in productivity during 2014-18.

Table 2.34: District wise percent Share and CAGR of APY of All Horticulture Crops for Uttar Pradesh in Zone-7 South-West Semi Arid Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Agra	21.92	3.9	23.83	5.6	24.76	1.7
Aligarh	11.42	-8.3	11.55	6.8	23.02	16.5
Etah	8.95	4.6	7.22	10.4	18.37	5.5
Firozabad	18.07	4.8	17.86	3.5	22.55	-1.3
Hathras	16.25	2.6	17.47	0.4	24.50	-2.2
Kasganj	7.96	4.9	6.57	0.1	18.85	-4.6
Mainpuri	10.48	6.1	10.23	7.2	22.25	1.0
Mathura	4.95	4.4	5.28	3.4	24.31	-0.9
Zone-7 South-West Semi Arid Zone	100.00	2.9	100.00	4.7	22.3	2.0

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

Table 2.34 explains the district wise percent share and CAGR of al horticulture crops in South West Semi-Arid Zone. It shows that the percentage share of area (TE 2018) is highest in Agra (21.92percent) followed by Firozabad (18.07percent) and Hathras (16.25percent), while the growth rate in area (2014-18) is highest in Mainpuri (6.1percent). It is significant that growth rate in area is negative in Aligarh (-8.3percent). The production share (TE 2018) is highest in Agra (23.83percent) followed by Firozabad (17.86percent) and Hathras (17.47percent). The growth rate in production is highest in Etah (10.4percent). The productivity per hectare (TE 2018) is highest in Agra (24.76percent) followed by Hathras (24.50percent) and Mathura (24.3percent). Growth rate in productivity for total horticulture crops is highest in Aligarh (16.5percent) while Firozabad (-1.3percent), Hathras (-

2.2percent), Kasganj (-4.6percent) and Mathura (-0.9percent) reported negative growth rate during 2014-18.

Table 2.35: District wise percent Share and CAGR of APY of All Fruit Crops for Uttar Pradesh in Zone-7 South-West Semi Arid Zone during 2013-14 to 2017-18

Districts	Total Fruit Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Agra	8.03	4.0	7.39	4.4	20.67	0.3
Aligarh	23.56	-21.9	21.64	4.3	20.62	33.5
Etah	15.97	3.8	16.46	5.0	23.13	1.2
Firozabad	6.02	4.9	8.68	5.4	32.36	0.4
Hathras	11.93	3.3	10.42	4.1	19.60	0.8
Kasganj	21.79	2.9	20.20	4.0	20.81	1.1
Mainpuri	7.45	8.2	11.64	10.2	35.07	1.9
Mathura	5.26	2.7	3.56	3.3	15.19	0.5
Zone-7 South-West Semi Arid Zone	100.00	1.0	100.00	5.1	23.4	5.0

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

According to table 2.35, Aligarh and Kasganj constitute more than 45percent of the total area (TE-2018) while growth rate in area is highest in Manipuri (8.2percent) during 2014-18. It is noteworthy that there has been a steep decline in growth rate of area in Aligarh (-21.9percent) during the same period. It is to be noted that in spite of sharp decline in growth rate in area, the production per hectare (TE-2018) and growth rate in productivity (2014-18) is highly significant in Aligarh. The growth rate in production is most prominent in Mainpuri (10.2percent) during 2014-18. The productivity per hectare (TE-2018) is highest in Mainpuri (35.07) while the growth rate in productivity is most significant in Aligarh (33.5percent) in total fruit crops in the selected zone.

Table 2.36: District wise percent Share and CAGR of APY of All Vegetable Crops for Uttar Pradesh in Zone-7 South-West Semi Arid Zone during 2013-14 to 2017-18

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Agra	26.06	3.8	26.73	5.6	25.15	1.8
Aligarh	10.37	3.6	10.21	7.6	24.13	3.9
Etah	7.14	5.9	5.61	13.8	19.22	7.5
Firozabad	18.95	4.4	19.16	3.4	24.83	-0.9
Hathras	18.23	2.4	18.83	0.1	25.34	-2.3
Kasganj	4.72	7.8	4.25	-2.4	22.23	-9.5
Mainpuri	9.18	7.7	9.57	7.2	25.59	-0.5
Mathura	5.35	4.6	5.63	3.4	25.83	-1.1
Zone-7 South-West Semi Arid Zone	100.00	5.0	100.00	4.8	24.0	-0.1

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above figures in table 2.36 shows that percentage share of area (TE-2018) is highest in Agra (26.06percent) followed by Hathras (18.23percent) while growth rate in area is most significant in Kasganj (7.8percent) and Mainpuri (7.7percent) during 2014-18. The production share (TE-2018) of Agra (26.73) is highest while the growth rate in production is highest in Etah during 2014-18. The productivity per hectare (TE-2018) is lower than zone average in Etah and Kasganj districts. Though highest growth rate in productivity is reported in Etah (7.5percent), the zone as a whole reported negative growth rate in productivity during 2014-18 which shows that it has not shown much improvement in productivity in total vegetable crops in the selected zone.

Table 2.37: District wise percent Share and CAGR of APY of All Spice Crops for Uttar Pradesh in Zone-7 South-West Semi-Arid Zone during 2013-14 to 2017-18

Districts	Total Spices Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Agra	2.09	16.4	0.44	12.3	1.01	-3.5
Aligarh	1.20	3.0	1.00	0.9	3.97	-2.0
Etah	15.93	0.5	19.23	0.3	4.56	0.5
Firozabad	30.01	8.2	22.79	1.9	8.60	8.2
Hathras	2.63	12.4	0.87	5.8	0.75	12.4
Kasganj	18.15	1.4	20.84	0.4	5.20	1.4
Mainpuri	29.87	0.6	34.80	0.3	8.56	0.6
Mathura	0.11	23.1	0.02	23.1	0.03	23.1
Zone-7 South-West Semi Arid Zone	100.00	8.2	100.00	5.6	4.1	5.1

Source: Horticulture and Food Processing Department, UP Govt., UP Udyan Bhawan, 2-Sapru Marg, Lucknow

The figures indicate that share of area (TE-2018) under total spice crops in zone 7 was highest in Firozabad (30.06percent) followed by Manipuri (29.87percent). These Two districts constitute more than 59percent share in area. The growth rate in area is highest in Mathura (23.1percent) followed by Agra (16.4percent) during 2014-18. Production share (TE-2018) is highest in Mainpuri (34.80percent) followed by Firozabad (22.74percent). The growth rate in production is exceptionally high in Mathura (23.1percent) followed by Agra (12.3percent) during 2014-18. The productivity per hectare (TE-2018) is most impressive in Firozabad (8.60percent) and Mainpuri (8.56percent) whereas the growth rate in productivity is most prominent in Mathura (23.1percent) followed by Hathras (12.4percent). Also, Agra and Aligarh reported a negative growth rate in productivity during 2014-18.

Table 2.38: District wise percent Share and CAGR of APY of Various Horticulture Crops for Uttar Pradesh in Zone-8 Vindhya Area during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Mirzapur	52.26	9.5	48.97	7.0	15.66	-2.3
Sant Ravidas Ngr.	22.00	2.7	24.63	4.9	18.67	2.2
Sonbhadra	25.74	5.4	26.39	8.3	17.10	2.8
Zone-8 Vindhya Area	100.00	5.9	100.00	6.7	17.1	0.9
	Total Fruits					
Mirzapur	40.13	3.2	40.61	1.8	17.53	-1.3
Sant Ravidas Ngr.	58.39	1.7	57.90	2.7	17.17	0.9
Sonbhadra	1.48	7.4	1.49	9.2	17.38	1.7
Zone-8 Vindhya Area	100.00	4.1	100.00	4.6	17.4	0.4
	Total Vegetables					
Mirzapur	51.58	9.0	50.57	7.8	17.54	-1.1
Sant Ravidas Ngr.	15.82	3.3	17.82	6.5	20.08	3.1
Sonbhadra	32.59	5.4	31.61	8.3	17.29	2.8
Zone-8 Vindhya Area	100.00	5.9	100.00	7.6	18.3	1.6
	Total Spices					
Mirzapur	92.24	24.7	83.40	24.5	1.39	24.7
Sant Ravidas Ngr.	2.52	23.1	2.23	23.1	0.04	23.1
Sonbhadra	5.24	6.5	14.36	2.3	0.08	6.5
Zone-8 Vindhya Area	100.00	18.1	100.00	16.7	0.5	18.1

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow.

Table 2.38 explains the district wise percent share and CAGR of APY of various horticulture crops in Vindhya area zone which reveals that according to TE-2018 figures Mirzapur dominates the Zone with 52.26percent area in total horticulture crops. The same trend is seen in terms of growth rate in area during 2014-18. The production share (TE-2018) is also highest in Mirzapur (48.97percent) while growth rate of production is most significant in Sonbhadra (8.31percent) during 2014-18. The productivity per hectare (TE-2018) is highest in Sant Ravidas Nagar (18.67). Though growth rate of productivity is highest in Sonbhadra (2.8percent) whereas it is found negative in Mirzapur (-2.3percent) during 2014-18. This reveals that in Vindhya zone, Mirzapur district has shown much improvement in total horticulture crops.

Further, it was found that Sant Ravidas Nagar leads the zone in terms of share of area (TE 2018) but the growth rate in area is highest in Sonbhadra (7.4percent) during 2014-18 for the total fruit crops in selected zone. In terms of production share also Sant Ravidas Nagar led the way (TE 2018) whereas growth rate in production (2014-18) is highest in Sonbhadra. It is

interesting to note that productivity per hectare (TE 2018) is almost same in all three districts of the zone. The growth rate in productivity is negative in Mirzapur during 2014-18.

The figures in the table yields the more or less the same results for total vegetable crops in zone 8 as above wherein share of area (TE 2018) growth rate in area (2014-18) and production share (TE 2018) is highest in Mirzapur while growth rate in production (2014-18) is highest in Sonbhadra (8.3percent). The productivity per hectare (TE 2018) is highest in Santi Ravidas Nagar. The growth rate in productivity per hectare is highest in Sant Ravidas Nagar (3.1percent) while it is negative in Mirzapur during 2014-18. In term of total spices crops, Mirzapur dominates the zone in all aspects whether be the area, production or productivity.

Table 2.39: District wise percent Share and CAGR of APY of All Horticulture Crops for Uttar Pradesh in Zone-9 Western Plain Zone during 2013-14 to 2017-18

Districts	Total Horticulture					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Baghpat	4.31	4.4	5.07	5.7	25.14	1.3
Bulandshahr	25.55	3.9	25.01	6.8	20.88	2.8
G B Nagar	0.64	3.8	0.74	10.0	24.70	6.0
Ghaziabad	4.80	5.7	6.45	6.5	28.66	0.7
Hapur	7.55	5.4	7.47	9.2	21.12	3.6
Meerut	17.50	5.0	17.98	7.3	21.93	2.2
Muzaffarnagar	9.47	3.4	8.65	6.5	19.48	3.0
Saharanpur	25.68	2.4	24.24	3.9	20.15	1.5
Shamli	4.51	5.8	4.39	7.1	20.81	1.3
Zone-9 Western Plain Zone	100.00	4.4	100.00	7.0	22.5	2.5

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table explains the share of all horticulture crops in western plain zone where figures in table indicates that more than 50percent area (TE 2018) is claimed by two districts namely, Saharanpur and Bulandshahar while growth rate in area (2014-18) is highest in Sharmli (5.8percent) followed by Ghaziabad (5.7percent) and Hapur (5.4percent). The production share (TE 2018) is highest in Bulandshahar (25.1percent) followed by Saharanpur (24.24percent). The growth rate in production (2014-18) is highest in GB Nagar (10.0percent) followed by Hapur (9.2percent). The productivity per hectare (TE 2018) is found to be highest in Ghaziabad followed by Baghpat, while growth rate in productivity per hectare (2014-18) is highest in G.B Nagar followed by Muzaffarnagar.

Table 2.40: District wise percent Share and CAGR of APY of All Fruit Crops for Uttar Pradesh in Zone-9 Western Plain Zone during 2013-14 to 2017-18

Districts	Total Fruit Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Baghpat	2.68	2.5	2.58	3.7	17.50	1.1
Bulandshahr	23.10	2.0	22.28	3.1	17.55	1.1
G B Nagar	0.12	7.1	0.12	8.4	18.05	1.2
Ghaziabad	0.56	3.8	0.55	6.5	17.76	2.6
Hapur	4.97	1.9	4.55	3.5	16.67	1.6
Meerut	12.96	2.1	11.87	3.2	16.66	1.1
Muzaffarnagar	10.12	2.4	9.33	4.2	16.77	1.8
Saharanpur	39.15	1.8	41.24	2.8	19.18	1.0
Shamli	6.33	3.3	7.50	3.9	21.58	0.5
Zone-9 Western Plain Zone	100.00	3.0	100.00	4.4	18.0	1.3

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The figures in table 2.40 shows that highest percentage of area (TE 2018) is reported in Saharanpur (39.15percent) followed by Bulandshahr (23.10percent). These two districts constitute more than 62percent area under total fruit crops in zone 9. The growth rate in area is most significant in G.B. Nagar (7.1percent) through on a smaller base during TE-2014-18. The same trend is found in terms of production where Saharanpur (41.24percent) and Bulandshar (22.28percent) taken together constitute more than 63percent production share in the zone (TE 2018). Growth rate in production is highest in GB Nagar (8.4percent) followed by Ghaziabad (6.5percent) during 2014-18. The productivity per hectare (TE 2018) is most significant in Shamli (21.58percent) and Saharanpur (19.18percent). The growth rate in productivity is highest in Ghaziabad (2.6percent) during 2014-18.

Table 2.41: District wise percent Share and CAGR of APY of All Vegetable Crops for Uttar Pradesh in Zone-9 Western Plain Zone during 2013-14 to 2017-18

Districts	Total Vegetable Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Baghpat	6.28	5.3	7.17	6.4	29.16	1.0
Bulandshahr	28.07	5.3	27.29	9.6	24.80	4.1
G B Nagar	1.25	3.5	1.25	10.1	25.70	6.4
Ghaziabad	9.57	5.5	11.38	6.5	30.36	0.9
Hapur	10.45	7.7	9.86	11.8	24.05	3.8
Meerut	23.02	6.9	23.12	9.2	25.63	2.2
Muzaffarnagar	8.73	4.5	8.08	8.9	23.60	4.2
Saharanpur	10.46	5.1	10.07	7.9	24.59	2.7
Shamli	2.18	14.9	1.78	22.5	20.78	6.6
Zone-9 Western Plain Zone	100.00	6.5	100.00	10.3	25.4	3.5

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The table 2.41 depicts that the area and growth rate of total vegetable crops in Western plain zone where it reveals that maximum area under total vegetable crops falls under Bulandsahar (28.07percent) in T.E-2018 whereas growth rate area is highest for Shamli followed by other districts. Same trend is seen for production as it is found highest for Bulandshahr and growth rate for production 2014-18 is highest in Shamli followed by Hapur. The growth rate of productivity in all vegetable crops is found highest in Shamli (6.6percent) than total zone productivity of 3.5percent whereas in T.E-2018, the productivity for vegetable crops was much closer for Saharanpur (24.59percent).

Table 2.42: District wise percent Share and CAGR of APY of All Spice Crops for Uttar Pradesh in Zone-9 Western Plain Zone during 2013-14 to 2017-18

Districts	Total Spices Crops					
	Area		Production		Productivity in MT Per Ha	
	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18	TE 2018	Growth rate 2014-18
Baghpat	1.84	16.2	0.89	12.4	0.94	-3.3
Bulandshahar	38.84	23.2	20.42	21.7	1.02	-1.3
G B Nagar	0.50	0.0	0.14	0.0	0.01	0.0
Ghaziabad	12.45	20.3	5.11	21.8	0.22	20.3
Hapur	11.99	1.5	35.64	0.8	0.22	1.5
Meerut	9.28	16.5	4.52	9.6	0.17	16.5
Muzaffarnagar	8.87	14.5	12.54	7.5	0.16	14.5
Saharanpur	4.23	27.3	5.36	31.5	0.08	27.3
Shamli	12.01	12.4	15.37	3.8	0.22	12.4
Zone-9 Western Plain Zone	100.00	14.7	100.00	12.1	0.3	9.8

Source: Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow

The above table 2.42 indicates the percentage share and CAGR of total spices crops in Western Zone. The above figure reveals that Bulandsahar (38.84percent) occupies first place in terms of area (TE-2018) under total spices crops while growth rate in area is highest in Saharanpur (27.3percent) during 2014-18. The share of production in particular zone (TE-2018) is highest in Hapur (35.64percent) whereas the growth rate in production is highest in Saharanpur (31.5percent) during 2014-18. The productivity per hectare (TE-2018) is higher than zone average in only two districts namely Bulandsahar and Baghpat. The growth rate in productivity is highest in Saharanpur (27.3percent) while Baghpat and Bulandsahar recorded a negative productivity growth during 2014-18. Thus, in zone 9, Saharanpur play an important role in total spice crops production.

X: CONCLUSION:

The foregoing analysis of data in the given chapter concludes that in terms of no. of projects, percent of share of project, subsidy allocation amount and percent share of subsidy, Uttar Pradesh is only behind Maharashtra.The State of Uttar Pradesh has performed convincingly better during 2014-18 than proceeding period at all India basis as is evident from the fact that growth in area and production of all horticulture crops in State did exceptionally well than 2009-13 .It holds first rank in terms of CAGR in area, third in terms of CAGR in production among all other States of India during 2014-18. The State has maximum area and production under total horticulture crops. Further, in terms of CAGR (area and production) of all fruit crops, the state ranked third and record respectively at all India level during 2014-18. In terms of CAGR of area and production of all vegetable crops, U.P. ranked first and third respectively at all India basis during 2014-18. Further, in case of CAGR of area of all spices crops, U.P. rank first but performed poorly in terms of CAGR (production) at all India level during 2014-18. U. P's growth was not found satisfactory against all other states in total spice crops. In case of CAGR of area and production of other Horticulture (Flower and Aromatic), Uttar Pradesh put up a poor performance at all India level during 2014-18. Though, it must be remembered that it did not performed much poorly in terms of production than area.

The chapter also explains the major share of various horticulture crops in the state which concludes that though the mango constituted major share in area and production (TE-2018). Papaya led the way in terms of growth rate in area, production and productivity per hectare for all major fruit crop in the State. Potato constituted major share in area, production and productivity per hectare in the State for Major vegetable crops while Garlic shared major area, production and productivity of Major spices crops in the state. The zone wise share and growth rate of various horticulture crops shows that in terms of area and production of total Horticulture crops, Central Zone and South West Semi-Arid Zone dominated the State. The share of area and production for all fruit crops is most significant in Central Zone of the State. The share of area and production for All Vegetable Crops is most significant in Central Zone and South West Semi-Arid Zone in the State. In terms of area and production of all spices crops, South West Semi-Arid Zone and Central Zone Dominated the State. Hence, it can be concluded that Uttar Pradesh holds a vast potential for development of horticulture sector, but it is still far from the realization of its actual potential. Hence, various suggestive measures by the government and the state should be taken for the commercialization and diversification of horticulture sector in the state, in order to improve the socio-economic conditions of horticulture growers.

CHAPTER III

Socio-Economic Characteristics of Horticultural Growers

I: Introduction

Socio-economic status (SES) is an important determinant of standard of living and health status as it influences the incidence and prevalence of various indicators on livelihoods. It is the total measure of person's work experience in relation to others and is determined by the individual's education, income, housing condition, occupation besides other important indicators.

Throughout the history of Indian agriculture, horticulture sector plays an important role in the development of an economy. U.P.'s horticulture also plays an important role in its economy by providing employment to a large section of the growers. It has emerged as one of the major agricultural activities, as there has been a substantial increase in both area and production of horticulture crops.

The present chapter analyzes the socio-economic status of various horticulture crop growers in nine selected districts of agro-climatic zones of Uttar Pradesh. The study tries to develop significant insights into the socio-economic conditions of growers engaged in horticulture sector. The study takes into consideration the sex, caste, age, social status, marital status, education level, employment status and size of landholdings of the growers of horticulture crops in selected districts of Uttar Pradesh.

II: Demographic Profile:

Demographic pattern is one of the most important factor of farming community as it is the primary source of labor for crop cultivation. Hence, a proper appraisal of its size and demography is needed to be studied. The below table explains the demographic profile of the household.

The table 3.1 shows the district wise distribution of sample households by caste and religion. Out of total 900 households, 73 percent households are from Other Backward Caste (OBC) category and 14 percent are from the scheduled caste (caste). Only 13 percent growers were from general category engaged in horticulture cropping. Out of total sampled households only around 8 percent were from Muslim religion and rest of Hindus. From these 8 percent

Muslims, most were those who are engaged in cultivation of horticulture crops from last 40 to 50 years.

Table 3.1: Distribution of Sample Households by Caste & Religion

District	Caste			Religion		
	General	OBC	SC	Hindu	Muslim	Total
Saharanpur	42	50	8	92	8	100
Gorakhpur	4	76	20	93	7	100
Sultanpur	10	82	8	88	12	100
Jalaun	3	91	6	95	5	100
Hathras	3	93	4	99	1	100
Mirzapur	15	69	16	100	0	100
Amroha	16	72	12	80	20	100
Kannauj	19	40	41	95	5	100
Rampur	1	84	15	88	12	100
Total	113 (12.56)	657 (73.00)	130 (14.44)	830 (92.22)	70 (7.78)	900 (100.00)

Source: Primary Survey, 2019.

The other important factor of the demographic indicators if size of the family. The table 3.2 shows the caste wise average size of family of the surveyed households. It depicts that size of family in general category is higher as compared to other caste i.e. 5.6 member per family as compared to 5.2 in OBC and 5.1 in SC category. It is because in general category household, most of the family were joint family while in OBC and SC most of family were nuclear.

Table 3.2: District wise Distribution of Household as per Size of Family by Caste (No.)

District	Category of Castes			
	General	OBC	SC	Total
Saharanpur	4.5	4.5	5.8	4.6
Gorakhpur	7.3	5.5	4.9	5.4
Sultanpur	5.1	5.6	4.0	5.4
Jalaun	4.3	5.2	4.8	5.2
Hathras	6.7	5.5	5.0	5.5
Mirzapur	5.1	5.2	4.8	5.1
Amroha	4.0	4.7	6.1	4.8
Kannauj	5.1	5.0	5.4	5.2
Rampur	8.0	4.9	4.5	4.9
Total	5.6	5.2	5.1	5.1

Source: Primary Survey, 2019.

The table 3.3 shows that percent distribution of total population by gender in sampled households. It reveals from the table that share of female population is around 45 percent.

Percentage share of female population was highest in Gorakhpur (47 percent) followed by Saharanpur and Rampur. Saharanpur has lowest population in no. as compared to other districts.

Table 3.3: Percentage Distribution of Population by Gender in Sampled Household

District	Gender		
	Male	Female	Total
Saharanpur	247 (53.93)	211 (46.07)	458 (100.00)
Gorakhpur	289 (53.13)	255 (46.88)	544 (100.00)
Sultanpur	308 (56.72)	235 (43.28)	543 (100.00)
Jalaun	282 (54.34)	237 (45.66)	519 (100.00)
Hathras	311 (56.34)	241 (43.66)	552 (100.00)
Mirzapur	289 (56.56)	222 (43.44)	511 (100.00)
Amroha	264 (55.35)	213 (44.65)	477 (100.00)
Kannauj	287 (55.41)	231 (44.59)	518 (100.00)
Rampur	264 (53.99)	225 (46.01)	489 (100.00)
Total	2541 (55.11)	2070 (44.89)	4611 (100.00)

Source: Primary Survey, 2019.

Table 3.4: District wise Percentage Distribution of Family Members by their Marital Status in Sampled Household (Age 15+)

District	Marital status			
	Married	Unmarried	Widow/Widower	Total
Saharanpur	55.6	42.7	1.7	100.0
Gorakhpur	50.0	49.0	1.0	100.0
Sultanpur	47.7	49.9	2.4	100.0
Jalaun	61.0	38.0	1.0	100.0
Hathras	42.5	55.5	2.0	100.0
Mirzapur	53.5	44.9	1.6	100.0
Amroha	51.4	47.2	1.4	100.0
Kannauj	54.4	44.5	1.0	100.0
Rampur	42.2	54.7	3.1	100.0
Total	50.9	47.4	1.7	100.0

Source: Primary Survey, 2019.

Table 3.4 depicts the district wise percent distribution of marital status of the family members of sampled household .It shows that 50.9percent of the total population are married whereas 47.4percent are found to be unmarried with 1.7percent are widow/widower. 61.0percent

married are from Jalaun district followed by Saharanpur (55percent) followed by Kannauj. The overall percentage of married are found to be higher than unmarried in sampled population.

Classification of population by age group gives an idea of the composition of the family by size and availability of labour force as well as dependency ratio. Table 3.5 shows the percent distribution of population by age group in selected district which reveals that maximum member in a family belongs to age group of 16-30 years i.e. 33.4percent where 19.6percent belongs to 31-45 years of age group. It is to be pointed out that combined 25.5 percent population were found below 15 year of age as they were considered to be children and ignorant about the economic activities of the households. Further, the table reveals that out of total 33.4percent population from age group 16-30 , maximum households are from Sultanpur (36.5percent) followed by Rampur (35.9percent) and Hathras (35.5percent) and other districts. It is to be noticed that only 5.4percent of the total population comes under age group of above 60 years.

Table 3.5: Percentage Distribution of Population by Age Group in Sampled Household

District	Age Groups						
	Below 6	**7 to 15**	**16 to 30**	**31 to 45**	**46 to 60**	**Above to 60**	**Total**
Saharanpur	7.2	14.8	30.3	23.1	17.7	6.6	100.0
Gorakhpur	6.6	20.2	32.0	18.0	15.8	7.4	100.0
Sultanpur	7.6	16.2	36.5	20.6	14.9	4.2	100.0
Jalaun	7.7	16.2	30.6	21.2	18.3	6.0	100.0
Hathras	8.2	19.6	35.5	16.5	15.4	4.9	100.0
Mirzapur	7.6	19.2	31.7	20.2	15.3	6.1	100.0
Amroha	8.2	16.8	34.8	17.4	16.6	6.3	100.0
Kannauj	10.6	15.1	32.8	19.1	18.0	4.4	100.0
Rampur	8.6	19.1	35.9	21.1	12.5	2.7	100.0
Total	8.0	17.5	33.4	19.6	16.0	5.4	100.0

Source: Primary Survey, 2019.

III: EDUCATIONAL STATUS:

Education is one of the important indicators of the socio-economic wellbeing of the family which shows the standard of living of the family. It is considered as one of the basic elements which determine the quality of manpower. The standard of education plays an important role on quality of human resources engaged in productive activities. Educational level of the growers influences not only their perceptions but also their expectations and work behavior.

Since education plays an important role in providing skills to the unskilled, it is important to discuss the educational status of the sampled households.

Table 3.6 provides the details of educational status of household population by sex in different districts .It indicates that total 21.7percent household population are found to be uneducated which comprises of 15.6percent male and 29.1percent female. In all the districts, it was found that only 8.9percent are educated where 6.7percent male and 11.5percent female found to be educated. Very low percentage of total population in all districts i.e. 2.1percent is found to have higher education. This indicates a deplorable way of education and it is clear from above table that many people do not get proper education in their formation age. However, there is a wide variation in the level of education.

Table 3.6: Percentage Distribution of Household Population by Education Level & Sex

Gender	District	Education Level								Total
		Uneducated	**Educated**	**Primary**	**High school**	**Intermediate**	**Graduate**	**Post Graduate**	**Technical Education**	
Male	Saharanpur	11.4	6.5	10.2	30.5	23.2	9.8	4.5	4.1	100.0
	Gorakhpur	15.2	5.5	15.6	45.3	11.4	4.5	1.0	1.4	100.0
	Sultanpur	13.0	4.9	9.4	37.7	16.9	12.7	3.9	1.6	100.0
	Jalaun	11.0	5.7	12.1	36.8	14.2	15.2	2.5	2.5	100.0
	Hathras	13.2	7.7	14.8	28	26.0	6.8	1.6	1.9	100.0
	Mirzapur	17.1	8.4	12.5	34.5	12.2	10.5	3.5	1.4	100.0
	Amroha	17.0	5.3	14.8	37.5	13.3	7.6	3.8	0.8	100.0
	Kannauj	19.1	8.3	13.9	34.1	10.8	11.8	2.1	0.0	100.0
	Rampur	23.9	8.3	14.0	31.8	7.6	9.5	3.0	1.9	100.0
	Total	15.6	6.7	13.0	35.2	15.1	9.8	2.8	1.7	900.0
Female	Saharanpur	14.2	10.9	18.0	30.8	12.8	8.5	3.8	0.9	100.0
	Gorakhpur	34.9	9.8	12.9	30.6	7.5	3.9	0.0	0.4	100.0
	Sultanpur	26.8	9.4	15.3	22.5	12.8	11.1	0.4	1.7	100.0
	Jalaun	28.4	6.4	19.9	29.2	7.2	8.1	0.4	0.4	100.0
	Hathras	24.1	17.0	17.0	24.9	9.1	5.4	1.7	0.8	100.0
	Mirzapur	29.9	10.4	14.0	24.9	13.6	5.0	1.4	0.9	100.0

Gender	District	Education Level								Total
		Uneducated	**Educated**	**Primary**	**High school**	**Intermediate**	**Graduate**	**Post Graduate**	**Technical Education**	
	Amroha	33.8	10.8	16.9	20.7	10.3	5.6	1.9	0.0	100.0
	Kannauj	31.7	14.8	17.4	23.9	7.4	3.5	1.3	0.0	100.0
	Rampur	37.1	14.3	20.1	20	4.0	3.1	0.9	0.4	100.0
	Total	29.1	11.5	16.8	25.4	9.3	6.0	1.3	0.6	100.0
Total	Saharanpur	12.7	8.5	13.8	30.6	18.4	9.2	4.2	2.6	100.0
	Gorakhpur	24.4	7.5	14.3	38.5	9.6	4.2	0.6	0.9	100.0
	Sultanpur	19.0	6.8	12.0	31.1	15.1	12.0	2.4	1.7	100.0
	Jalaun	18.9	6.0	15.6	33.4	11.0	12.0	1.5	1.5	100.0
	Hathras	17.9	11.8	15.8	26.6	18.7	6.2	1.6	1.4	100.0
	Mirzapur	22.6	9.3	13.2	30.3	12.8	8.1	2.6	1.2	100.0
	Amroha	24.5	7.8	15.7	30	11.9	6.7	2.9	0.4	100.0
	Kannauj	24.7	11.2	15.4	29.5	9.3	8.1	1.7	0.0	100.0
	Rampur	29.9	11.1	16.8	26.5	5.9	6.6	2.0	1.2	100.0
	Total	21.7	8.9	14.7	30.8	12.5	8.1	2.1	1.2	100.0

Source: Primary Survey, 2019.

Table 3.9 indicates the percentage distribution of household population by activity Status & sex. It reveals that in all districts total 46.8percent are employed which comprise of 58.1percent of male and 33.4percent female. 53.8percent of total population from Jalaun district has been found employed with 64.1percent male and 42.4percent female. 13.2percent of total population in all districts is found to be housewife where a large no. of population in household is student i.e. 33.3percent with 34.66percent male and 31.7percent female. It is to be noticed that only 0.7percent in all districts are found to be un- employed which reveals that higher percentage of total household population is involved in any activity of work where percentage of male is higher than female which is a good indicator of improved socio-economic condition of the horticulture growers in various district.

Table 3.9: Percentage Distribution of Household Population by Activity Status & Sex

Gender	District	Activity Status						Total
		Employed	Unemployed	Housewife	Student	Children	Senior Citizen	
Male	Saharanpur	59.3	1.2	1.2	30.3	5.4	2.5	100.0
	Gorakhpur	60.0	0.0	0.0	35.6	2.4	2.0	100.0
	Sultanpur	52.3	0.4	0.4	39.3	6.0	1.8	100.0
	Jalaun	64.1	0.0	0.4	29.7	4.7	1.2	100.0
	Hathras	57.2	0.0	0.0	37.3	4.2	1.3	100.0
	Mirzapur	49.6	0.4	0.4	41.1	4.9	3.7	100.0
	Amroha	56.5	1.9	1.2	33.8	5.4	1.2	100.0
	Kannauj	63.5	0.0	0.7	30.1	4.6	1.1	100.0
	Rampur	60.5	1.9	0.0	33.7	3.1	0.8	100.0
	Total	58.1	0.6	0.5	34.6	4.5	1.7	100.0
Female	Saharanpur	20.1	2.0	45.1	27.0	2.5	3.4	100.0
	Gorakhpur	28.3	0.4	30.3	34.0	6.1	0.8	100.0
	Sultanpur	35.7	0.0	26.4	31.7	5.3	0.9	100.0
	Jalaun	42.4	0.0	22.1	28.6	6.1	0.9	100.0
	Hathras	34.4	2.1	23.7	34.0	5.0	0.8	100.0
	Mirzapur	32.3	0.9	28.1	33.6	3.7	1.4	100.0
	Amroha	28.2	0.0	31.0	35.7	4.2	0.9	100.0
	Kannauj	41.7	0.4	23.3	28.7	5.8	0.0	100.0
	Rampur	36.0	0.9	26.1	31.1	5.4	0.5	100.0
	Total	33.4	0.7	28.2	31.7	4.9	1.0	100.0
Total	Saharanpur	41.3	1.6	21.3	28.8	4.0	2.9	100.0
	Gorakhpur	44.3	0.2	15.0	34.8	4.3	1.4	100.0
	Sultanpur	44.9	0.2	11.9	35.9	5.7	1.4	100.0
	Jalaun	53.8	0.0	10.7	29.2	5.3	1.0	100.0
	Hathras	47.3	0.9	10.3	35.9	4.5	1.1	100.0
	Mirzapur	41.5	0.6	13.4	37.6	4.3	2.6	100.0
	Amroha	43.8	1.1	14.6	34.7	4.9	1.1	100.0
	Kannauj	53.9	0.2	10.7	29.5	5.1	0.6	100.0
	Rampur	49.3	1.4	12.0	32.5	4.1	0.6	100.0
	Total	46.8	0.7	13.2	33.3	4.7	1.4	100.0

Source: Primary Survey, 2019.

IV: EMPLOYMENT STATUS - It is important to analyze the type of employment status of the household population in order to know the socio-economic condition of the growers involved in horticulture production. Hence, the below table 3.10 explains the percentage distribution of household population by type of employment status & gender which reveals that maximum number of household population i.e. 78.8percent are self-employed in all

district with 74.3percent male and 88.1percent female. Further, the table depicts that 13.1percent are having permanent work with 16.3percent male and 6.6percent female and 8.1percent are having temporary work with 9.4percent male and 5.3percent female. Thus, it is clear from the below table that higher percent of household population is involved in their own work and are self-employed.

Table 3.10: Percentage Distribution of Household Population by Type of Employment Status & Sex

Gender	District	Type of Employment			Total
		Self Employed	Permanent	Temporary	
Male	Saharanpur	79.2	9.0	11.8	100.0
	Gorakhpur	77.1	16.3	6.5	100.0
	Sultanpur	76.0	11.3	12.7	100.0
	Jalaun	79.9	13.0	7.1	100.0
	Hathras	69.7	16.3	14.0	100.0
	Mirzapur	74.2	14.5	11.3	100.0
	Amroha	70.3	20.9	8.8	100.0
	Kannauj	70.1	24.9	5.1	100.0
	Rampur	73.4	18.4	8.2	100.0
	Total	74.3	16.3	9.4	100.0
Female	Saharanpur	80.5	4.9	14.6	100.0
	Gorakhpur	88.0	2.7	9.3	100.0
	Sultanpur	92.7	2.4	4.9	100.0
	Jalaun	87.9	4.0	8.1	100.0
	Hathras	83.1	15.7	1.2	100.0
	Mirzapur	87.1	5.7	7.1	100.0
	Amroha	85.2	13.1	1.6	100.0
	Kannauj	92.2	4.4	3.3	100.0
	Rampur	91.4	7.4	1.2	100.0
	Total	88.1	6.6	5.3	100.0
Total	Saharanpur	79.5	8.1	12.4	100.0
	Gorakhpur	80.7	11.8	7.5	100.0
	Sultanpur	81.9	8.2	9.9	100.0
	Jalaun	82.8	9.7	7.5	100.0
	Hathras	73.9	16.1	10.0	100.0
	Mirzapur	78.9	11.3	9.8	100.0
	Amroha	74.6	18.7	6.7	100.0
	Kannauj	77.5	18.0	4.5	100.0
	Rampur	79.5	14.6	5.9	100.0
	Total	78.8	13.1	8.1	100.0

Source: Primary Survey, 2019.

Further, the employment status can be further divided on basis of primary and secondary occupation. Hence, it is important to analyze the household population on basis of their occupation which is explained in below Table 3.11 which reveals that overall 69.5percent

population is involved in agriculture where 68.8percent are male and 71.1percent are female. It is important to notice that females are much involved in agriculture than males. Further, it suggests that 10.3percent population is involved in non-agricultural activities with 6.3percent male and 19.1percent females. In all the districts only 2percent male and 1.6percent female are found to be getting govt. jobs with just 1.9percent of total household population. Further, it is seen from the table that 7.0percent are having private jobs with 9.3percent male and 1.9percent female. Overall 11.3percent are involved in agricultural and non- agricultural labour in all districts. Thus, it is clear from the table that a small portion of people are involved in govt. and private jobs whereas a large no. of population is involved in agricultural and non-agricultural activities and hence cannot do much for the development of the horticulture sector.

Table 3.11: Percentage Distribution of Household Population by Type of Employment Status (Primary Occupation) & Sex

Gender	District	Primary Occupation						Total
		Agriculture	Non agricultural	Government job	Private job	Agricultural labour	Non-agricultural labour	
Male	Saharanpur	74.1	6.3	1.4	13.3	0.7	4.2	100.0
	Gorakhpur	66.5	10.8	1.1	13.6	2.8	5.1	100.0
	Sultanpur	72.4	5.3	6.5	8.8	0.6	6.5	100.0
	Jalaun	73.0	4.9	1.6	9.2	1.1	10.3	100.0
	Hathras	64.0	5.1	2.8	12.9	1.1	14.0	100.0
	Mirzapur	73.5	7.4	3.1	6.2	3.1	6.8	100.0
	Amroha	65.5	8.8	0.7	5.4	2.0	17.6	100.0
	Kannauj	62.4	2.8	0.6	8.4	5.6	20.2	100.0
	Rampur	68.6	6.3	0.0	5.7	11.3	8.2	100.0
	Total	68.8	6.3	2.0	9.3	3.1	10.4	100.0
Female	Saharanpur	85.0	5.0	2.5	2.5	5.0	0.0	100.0
	Gorakhpur	81.1	12.2	1.4	2.7	1.4	1.4	100.0
	Sultanpur	59.0	36.1	1.2	3.6	0.0	0.0	100.0
	Jalaun	64.3	27.6	3.1	2.0	2.0	1.0	100.0
	Hathras	68.7	13.3	2.4	4.8	10.8	0.0	100.0
	Mirzapur	59.7	33.3	1.4	1.4	1.4	2.8	100.0
	Amroha	65.6	23.0	0.0	0.0	11.5	0.0	100.0
	Kannauj	83.9	6.5	2.2	0.0	6.5	1.1	100.0
	Rampur	77.8	9.9	0.0	0.0	7.4	4.9	100.0

Gender	District	Primary Occupation						Total
		Agriculture	Non agricultural	Government job	Private job	Agricultural labour	Non-agricultural labour	
	Total	71.1	19.1	1.6	1.9	5.0	1.3	100.0
Total	Saharanpur	76.5	6.0	1.6	10.9	1.6	3.3	100.0
	Gorakhpur	70.8	11.2	1.2	10.4	2.4	4.0	100.0
	Sultanpur	68.0	15.4	4.7	7.1	0.4	4.3	100.0
	Jalaun	70.0	12.7	2.1	6.7	1.4	7.1	100.0
	Hathras	65.5	7.7	2.7	10.3	4.2	9.6	100.0
	Mirzapur	69.2	15.4	2.6	4.7	2.6	5.6	100.0
	Amroha	65.6	12.9	0.5	3.8	4.8	12.4	100.0
	Kannauj	69.7	4.1	1.1	5.5	5.9	13.7	100.0
	Rampur	71.7	7.5	0.0	3.8	10.0	7.1	100.0
	Total	69.5	10.3	1.9	7.0	3.7	7.6	100.0

Source: Primary Survey, 2019.

Table 3.12 reveals the percentage distribution of household population by type of employment status (secondary occupation) by gender which shows that overall population in all districts (maximum 42.8percent of population) is involved in non-agricultural activities and 39.4percent are involved in agricultural activities where 42.4percent are males and 34.5percent females are engaged in agricultural activities and 31.6percent male and 60.4percent female are found to be engaged in non-agricultural activities. It is important to notice that in all districts only 1.0percent are engaged in private jobs whereas the percentage of female is nil. Further, 9.7percent are agricultural labour with 13.0percent male and 4.4percent female whereas 7.2percent are non-agricultural labour with only 0.6percent female.

Table 3.12: Percentage Distribution of Household Population by Type of Employment Status (Secondary Occupation) & Sex

Gender	District	Secondary Occupation					Total
		Agriculture	Non_Agriculture	Private job	Agricultirall abour	Non-agricultural labour	
Male	Saharanpur	81.8	4.5	0.0	13.6	0.0	100.0
	Gorakhpur	50.0	18.4	0.0	10.5	21.1	100.0
	Sultanpur	31.2	48.1	1.3	6.5	13.0	100.0
	Jalaun	33.7	47.7	1.2	12.8	4.7	100.0
	Hathras	40.5	32.9	1.3	17.7	7.6	100.0
	Mirzapur	24.3	37.8	2.7	20.3	14.9	100.0
	Amroha	69.8	25.6	0.0	0.0	4.7	100.0
	Kannauj	42.7	20.7	3.7	13.4	19.5	100.0
	Rampur	55.0	15.0	1.7	16.7	11.7	100.0
	Total	42.4	31.6	1.6	13.0	11.4	100.0
Female	Saharanpur	10.5	78.9	0.0	5.3	5.3	100.0
	Gorakhpur	16.2	81.1	0.0	2.7	0.0	100.0
	Sultanpur	37.8	62.2	0.0	0.0	0.0	100.0
	Jalaun	42.6	55.9	0.0	1.5	0.0	100.0
	Hathras	43.5	54.3	0.0	2.2	0.0	100.0
	Mirzapur	35.2	57.4	0.0	7.4	0.0	100.0
	Amroha	46.4	53.6	0.0	0.0	0.0	100.0
	Kannauj	28.1	56.3	0.0	15.6	0.0	100.0
	Rampur	31.3	56.3	0.0	9.4	3.1	100.0
	Total	34.6	60.4	0.0	4.4	0.6	100.0
Total	Saharanpur	48.8	39.0	0.0	9.8	2.4	100.0
	Gorakhpur	33.3	49.3	0.0	6.7	10.7	100.0
	Sultanpur	33.6	53.3	0.8	4.1	8.2	100.0
	Jalaun	37.7	51.3	0.6	7.8	2.6	100.0
	Hathras	41.6	40.8	0.8	12.0	4.8	100.0
	Mirzapur	28.9	46.1	1.6	14.8	8.6	100.0
	Amroha	60.6	36.6	0.0	0.0	2.8	100.0
	Kannauj	38.6	30.7	2.6	14.0	14.0	100.0
	Rampur	46.7	29.3	1.1	14.1	8.7	100.0
	Total	39.4	42.8	1.0	9.7	7.2	100.0

Source: Primary Survey, 2019.

V: LAND HOLDING STATUS

The land details of the respondents are important because it indicates the economic and social status of the households. Generally the size of land affects the crop pattern, agricultural income, output and adoption of improved technology and other initiatives.

Table 3.13 shows district wise distribution of percent share of household by land group. It reveals that out of total 900 households selected for study, around 73.7 percent were marginal farmers, 16.0 percent small farmers, 5.4 percent were medium farmers and 1.9percent were large farmers and 3 percent were found to be landless. It was found that among all district, the proportion of marginal farmers was higher for all district where Kannauj hold 93percent of marginal land holding with only 3 percent of small landholding where 4percent found to be landless. No household was found in kannauj district to hold large holding. Further, the table reveals that the proportion of small farmer was highest for Saharanpur with 25 percent and 22 percent medium and 8 percent large farmers. 5 percent were found to be landless. It was found that in Saharanpur district, the proportion of large farmers was highest (8percent) as compared to other districts. In district Amroha, no landless workers were found.

Table 3.14 explains the district wise percent share and area by land group which reveals that out of total area of land i.e. 2892.6 acre, Saharanpur holds 614.9 acre of area where highest percentage is of medium size of land holding with 30 percent and 24.5percent is of large size land holding followed by small and marginal size of land group with 21.6percent and 16.5percent. Out of total area, 7.4percent of area is found to be landless in Saharanpur district.

Table 3.13: District wise percent Share of Household by Land group

District	Landless	Marginal	Small	Medium	Large	Total
Saharanpur	5 (5.0)	40 (40.0)	25 (25.0)	22 (22.0)	8 (8.0)	100
Gorakhpur	4 (4.0)	89 (89.0)	5 (5.0)	0 (0.0)	2 (2.0)	100
Sultanpur	1 (1.0)	86 (86.0)	13 (13.0)	0 (0.0)	0 (0.0)	100
Jalaun	1 (1.0)	52 (52.0)	31 (31.0)	12 (12.0)	4 (4.0)	100
Hathras	4 (4.0)	76 (76.0)	19 (19.0)	1 (1.0)	0 (0.0)	100
Mirzapur	2 (2.0)	75 (75.0)	13 (13.0)	8 (8.0)	2 (2.0)	100

District	Landless	Marginal	Small	Medium	Large	Total
Amroha	0 (0.0)	73 (73.0)	22 (22.0)	4 (4.0)	1 (1.0)	100
Kannauj	4 (4.0)	93 (93.0)	3 (3.0)	0 (0.0)	0 (0.0)	100
Rampur	6 (6.0)	79 (79.0)	13 (13.0)	2 (2.0)	0 (0.0)	100
Total	27 (3.0)	663 (73.7)	144 (16.0)	49 (5.4)	17 (1.9)	900

Source: Primary Survey, 2019. **Note:** Figures in brackets shows percentages to total

Further, Jalaun holds the second place in total area i.e. 464.5 acre of land area where the proportion of small land holding size of area is highest (35.1percent) as compared to other land group where 0.6 percent is found to be landless, followed by Mirzapur which holds the third place in total area by land i.e. 338.0 acre of land .Also, 44.4percent of area is cover by marginal land group followed by medium land group and small i.e. 21.4percent and 17.9percent whereas 1.4 percent of land area is found to be landless.

It reveals that out of total area covered by total land group in all district, Kannauj cover the lowest area under land i.e. 151.6 acre where 77percent acre of land is of marginal and 18.7percent is of small size with 4.4percent of area is found to be landless. It was noticed that Kannauj was not found to cover medium and large size of land. The table reveals that out of total area covered by all districts, the highest proportion of area is covered by marginal land group i.e. 42.9 percent followed by small (28.2percent), medium (15.6percent) and large (10.0percent) land group. Overall 3.3 percent area is found to be landless.

Table 3.14: District wise percent Share and Area (acre) by Land group

	Landless	Marginal	Small	Medium	Large	Total
Saharanpur	45.8 (7.4)	101.7 (16.5)	132.7 (21.6)	184.3 (30.0)	150.4 (24.5)	614.9
Gorakhpur	5.5 (2.4)	177.5 (76.0)	24.5 (10.5)	(0.0)	26.0 (11.1)	233.5
Sultanpur	2.9 (1.2)	153.0 (61.1)	94.7 (37.8)	(0.0)	(0.0)	250.6
Jalaun	3.0 (0.6)	110.0 (23.7)	163.0 (35.1)	133.4 (28.7)	55.1 (11.9)	464.5
Hathras	5.8 (2.2)	142.8 (53.7)	97.3 (36.6)	20.0 (7.5)	(0.0)	265.9
Mirzapur	4.8 (1.4)	150.2 (44.4)	60.5 (17.9)	72.2 (21.4)	50.3 (14.9)	338.0
Amroha	(0.0)	129.4 (48.8)	104.4 (39.4)	24.6 (9.3)	6.7 (2.5)	265.1
Kannauj	6.6 (4.4)	116.7 (77.0)	28.3 (18.7)	(0.0)	(0.0)	151.6
Rampur	20.5 (6.6)	160.6 (52.0)	110.4 (35.7)	17.5 (5.7)	(0.0)	309.0
Total	94.4 (3.3)	1241.9 (42.9)	815.8 (28.2)	452.0 (15.6)	288.5 (10.0)	2892.6

Source: Primary Survey, 2019. **Note:** Figures in brackets shows percentages to total

VI: Land Owned by the Respondents

The type of ownership of land often influences crop pattern and adoption of technology. Therefore, it is essential to look into the nature of ownership of land. Table 3.15 shows the district wise details of land holding per household. It reveals that the total ownership holding of land per household in all districts was 65.7 percent where the operational holding or cultivated land was 66.2 percent with 2.13 acre sown area. The cultivated land was highest for Saharanpur with 83.0 percent followed by Amroha with 79.9 percent and other districts. The cultivated area of land per household was found lowest for Sultanpur and Rampur. Mostly households were owner cultivators. The proportion of leased in and leased out land is 4.1 percent and 9.8 percent respectively. Only 33.8 percent of cultivated land was found to be sown more than once and 0.8 percent of land was found to be as non-agricultural area

Table 3.16 explains the districts wise land holding details of sample households. The ownership holdings of sampled households was 99.2 percent i.e.,1899.7 acre of land holding where Saharanpur holds 461.5 acre of own land area followed by Jalaun with 333.4 acre of land. Kannauj was found to cover only 71.5 acre of own land. The cultivated area of the sampled households was highest for Saharanpur followed by Jalaun. 51percent of area of cultivated land is sown more than once.

Table 3.15: District wise Details of Land per Household

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Own Land Area (in acre)	4.61	1.38	1.35	3.33	1.62	2.23	2.25	0.71	1.51	2.11
	(75.1)	(59.2)	(53.9)	(71.8)	(61.0)	(65.8)	(84.8)	(47.1)	(48.7)	(65.7)
Lease In Area (in acre)	0.49	0.02	0.02	0.03	0.05	0.08	0.11	0.14	0.26	0.13
	(8.0)	(1.1)	(1.0)	(0.6)	(1.7)	(2.3)	(4.0)	(9.2)	(8.5)	(4.1)
Lease Out Area (in acre)	1.19	0.21	0.02	0.25	0.02	0.18	0.55	0.00	0.42	0.32
	(19.4)	(9.0)	(0.9)	(5.4)	(0.8)	(5.3)	(20.6)	(0.0)	(13.7)	(9.8)
Non-agricultural Area (in acre)	0.00	0.01	0.00	0.12	0.00	0.04	0.01	0.00	0.05	0.03
	(0.0)	(0.5)	(0.0)	(2.5)	(0.0)	(1.2)	(0.3)	(0.0)	(1.7)	(0.8)
Sown Area (in acre)	5.10	1.35	1.29	3.00	1.65	2.08	2.12	0.85	1.71	2.13
	(83.0)	(57.9)	(51.6)	(64.6)	(62.0)	(61.6)	(79.9)	(56.4)	(55.3)	(66.2)
Sown more than once Area (in acre)	1.04	0.98	1.21	1.64	1.01	1.30	0.53	0.66	1.38	1.09
	(17.0)	(42.1)	(48.4)	(35.4)	(38.0)	(38.4)	(20.1)	(43.6)	(44.7)	(33.8)

Source: Primary Survey,2019. **Note:** Figures in brackets shows percentages to total

Table 3.16: District wise Details of Land of Sampled Households

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Own Land Area (in acre)	461.5 (90.4)	138.4 (102.4)	135.1 (104.5)	333.4 (111.1)	162.1 (98.5)	222.5 (106.9)	224.9 (106.2)	71.5 (83.6)	150.5 (88.1)	1899.7 (99.2)
Lease In Area (in acre)	48.9 (9.6)	2.5 (1.8)	2.5 (1.9)	3.0 (1.0)	4.5 (2.7)	7.6 (3.7)	10.5 (5.0)	14.0 (16.4)	26.3 (15.4)	119.8 (6.3)
Lease Out Area (in acre)	119.0 (23.3)	21.0 (21.0)	2.3 (1.8)	24.9 (8.3)	2.0 (1.2)	18.0 (8.6)	54.7 (25.8)	(0.0)	42.2 (24.7)	284.1 (14.8)
Non-agricultural Area (in acre)	(0.0)	1.0 (0.7)	(0.0)	7.0 (2.3)	(0.0)	(0.0)	0.9 (0.4)	(0.0)	(0.0)	8.9 (0.5)
Barren Land Area (in acre)	(0.0)	0.2 (0.1)	6.0 (4.6)	4.5 (1.5)	(0.0)	4.0 (1.9)	(0.0)	(0.0)	5.1 (3.0)	19.8 (1.0)
Sown Area (in acre)	510.4 (100.0)	135.1 (100.0)	129.3 (100.0)	300.0 (100.0)	164.6 (100.0)	208.1 (100.0)	211.8 (100.0)	85.5 (100.0)	170.9 (100.0)	1915.7 (100.0)
Sown more than once Area (in acre)	104.48 (20.5)	98.40 (72.8)	121.28 (93.8)	164.49 (54.8)	100.99 (61.4)	129.86 (62.4)	53.29 (25.2)	66.12 (77.4)	138.01 (80.7)	976.92 (51.0)
Gross Sown Area (in acre)	614.9	233.5	250.6	464.5	265.6	338.0	265.1	151.6	309.0	2892.6
Cropping Intensity	(120.5)	(172.8)	(193.8)	(154.8)	(161.4)	(162.4)	(125.2)	(177.4)	(180.7)	(151.0)

Source: Primary Survey, 2019. **Note:** Figures in brackets shows percentages to total

The proposition of total lease in and lease out was 6.3 percent and 14.8 percent respectively where 48.9 acre of land is under 'lease in' in Saharanpur district. It was found that no land was lease out in Kannauj district. It was found that overall 0.5 percent of land was under non-agricultural area where 7.0 acre of land in Jalaun district was under non-agricultural use.

VII: IRRIGATION STATUS

Irrigation is one of the most vital inputs in modern agriculture. For sustainable development of agricultural sector, availability of irrigational facilities is critical for adoption of improved technology in farming. It plays an important role in productivity per unit of land.

The table 3.17 explains the district wise distribution of irrigated and unirrigated area. It reveals that out of total area of land i.e. 1899.7 acre, 92.74 percent of total area is irrigated by different sources and only 7.26 percent of area is unirrigated. Out of total area of land in Saharanpur i.e. 461.5 acre, 98.29 percent is irrigated and only 1.71 percent is unirrigated. The highest un-irrigated area of land is in Kannauj and Mirzapur i.e.18.23 percent and 15.57 percent respectively.

Table 3.17: District wise Distribution of Irrigated Area:

Districts	Total Area	percent of Total Irrigated Area	percent of Unirrigated
Saharanpur	461.5	98.29	1.71
Gorakhpur	138.4	90.85	9.15
Sultanpur	135.1	90.43	9.57
Jalaun	333.4	97.29	2.71
Hathras	162.1	98.32	1.68
Mirzapur	222.5	84.43	15.57
Amroha	224.9	94.42	5.58
Kannauj	71.5	81.77	18.23
Rampur	150.5	86.12	13.88
Total	1899.7	92.74	7.26

Source: Primary Survey, 2019.

Table 3.18 explains the district wise distribution of sampled households by different source of irrigation i.e. through canals, tube wells, pump sets or wells. It was found that Pump sets & Tube wells are the major source of irrigation of sampled households. In Saharanpur & Gorakhpur cannel are also a source of irrigation.

Table 3.18: District wise Distribution of Sampled Households by Different Source of Irrigation

Multiple response

Districts	Source of Irrigation				
	Canals	Tube well	Pump sets	Lake/Wells	Total
Saharanpur	12	76	17	-	100
Gorakhpur	12	6	86	1	100
Sultanpur	-	40	65	0	100
Jalaun	8	33	66	1	100
Hathras	-	73	30	-	100
Mirzapur	1	45	47	1	100
Amroha	1	74	24	-	100
Kannauj	1	56	44	-	100
Rampur	1	10	89	1	100
Total	36	413	468	4	900
percent share	4.00	45.89	52.00	0.44	900 (100.0)

Source: Primary Survey,2019. **Note:** Figures in brackets shows percentages to total

Table 3.19 explains the area under irrigation by different sources in sampled households. It reveals that out of total irrigated area in Saharanpur, 82.41 percent was found to be irrigated by tube wells and nearly about 18 percent of area is irrigated by canal and pump sets whereas no land was found to be irrigated by lake/wells. Further, in Gorakhpur district, most of the irrigated area was irrigated by pump sets i.e. 48.46 percent and 36.82 percent was irrigated by

tube wells while around 15 percent of irrigated land was found to be irrigated through canals and lakes/wells.

Table 3.19: Irrigated area by Source on Sample Farm as Percent of Total Irrigated Area

Multiple response

District	Canal Irrigated	Tube well Irrigated	Pumping set Irrigated	Lake/well Irrigated
Saharanpur	8.40	82.41	9.20	0.00
Gorakhpur	11.14	36.82	48.46	3.58
Sultanpur	0.00	55.44	43.38	1.18
Jalaun	2.35	48.46	48.58	0.61
Hathras	0.00	80.47	19.53	0.00
Mirzapur	0.63	69.46	25.51	4.40
Amroha	0.34	89.52	10.14	0.00
Kannauj	0.48	44.95	54.57	0.00
Rampur	0.34	42.45	56.86	0.34
Total	3.37	64.38	31.26	1.00

Source: Primary Survey, 2019.

In Sultanpur district, tube wells and pump sets are major source of irrigation while no irrigated land was found to be irrigated through canals. Tube well was found to be major source of irrigation in Hathras where it was noticed that no land was irrigated through canals and lakes. In a nutshell, tube wells and pump sets were the major source of irrigation in sampled farms.

VIII: INCOME OF THE SAMPLED HOUSEHOLDS

Income plays a vital role in the socio-economic condition of any person. Hence, it is important to study the income of sampled households by its source (table 3.20). Average household income of the sampled houses is Rs. 227753. It was found that 37.9 percent of income was contributed through Horticulture whereas just 15.1 percent of household income was contributed through agriculture, while animal husbandry contributed about 9.7 percent of household income. 9.6 percent of income was derived from other sectors whereas remaining 27 percent of income was derived from various sources such as govt. job, non-agricultural labour, remittances, pension etc.

Table 3.20: District wise Distribution of Current Year Income of Sampled Households by its Source

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculture	22.8	13.5	10.9	17.3	8.1	11.5	19.1	8.5	15.8	15.1
Horticulture	62.8	37.0	22.7	32.9	35.1	30.2	25.5	28.1	44.3	37.9
Animal husbandry	2.1	9.0	13.0	9.3	10.6	12.4	23.7	6.8	6.0	9.7
Fishery bee keeping	0.0	1.1	0.0	0.0	0.1	0.4	0.0	0.3	0.5	0.2
Graminartisans	0.3	2.7	0.0	1.0	0.0	1.1	0.3	0.4	0.8	0.7
Agriculture Labour	0.7	2.4	1.9	2.1	3.7	2.7	2.0	7.4	5.6	2.8
Non-Ag labour	0.9	8.6	5.6	6.3	11.6	6.4	8.1	23.8	10.6	7.9
Govt job	1.6	7.4	24.2	3.8	10.6	13.8	1.7	4.9	2.1	7.5
Self-Employment	3.2	6.3	6.3	9.1	11.2	3.6	4.2	6.4	2.7	5.6
Rent installments	0.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.1
Remittances	0.9	3.8	1.7	1.1	1.5	0.8	0.0	1.9	0.0	1.2
Pension	1.2	2.4	6.1	0.3	0.9	3.0	0.5	0.1	0.5	1.7
Others Sector	2.9	5.8	7.4	16.5	6.6	13.9	14.8	11.3	11.0	9.6
Total Income (Rs.)	100	100	100	100	100	100	100	100	100	100
HH Income (Rs.)	**439462**	**164657**	**220171**	**223361**	**199630**	**251880**	**209718**	**159521**	**198360**	**227753**

Source: Primary Survey, 2019.

Across districts, its range is Rs. 159221in Kannauj to Rs. 439462 in Saharanpur. Further, the table reveals that out of total household income of Saharanpur district, 62.8 percent of income was contributed through Horticulture while 22.8 percent of income is contributed by agriculture while remaining 15 percent of income was derived from other sources. Further in the below table it was seen that Rampur derived 44.3 percent of income through horticulture and 15.8 percent through agriculture.10.6 percent of income in same district was derived through non- agricultural labour and 6.0 percent through animal husbandry. Fishery, bee keeping, rural artisans and remittances are not of much significance in the district. The proportion of income derived by horticulture was much more than income derived through agriculture in all sampled households which shows that horticulture is one of the main source of income in the district.

Table 3.21 shows the distribution of previous year income of sampled households by its source. It explains that in the previous year, the total income of sampled households was derived through horticulture i.e. 35.8 percent of total household income which shows improvement in the current year as source of income derived through horticulture was improved in the current year i.e. 37.9 percent.

Table 3.21: Distribution of Previous year Income of Sampled Households by its Source

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculture	27.1	12.3	10.4	16.7	7.9	11.7	19.0	9.3	16.7	15.5
Horticulture	55.6	41.1	24.5	31.3	34.5	29.3	26.0	27.0	43.2	35.8
Animal husbandry	3.0	8.9	12.7	9.2	10.5	12.6	23.9	6.3	5.9	10.1
Fishery bee keeping	0.0	1.0	0.0	0.0	0.4	0.5	0.0	0.3	0.6	0.3
Graminartisans	0.3	2.9	0.0	1.0	0.0	1.1	0.2	0.4	0.8	0.7
Agriculture Labour	0.8	2.1	2.0	1.9	3.9	2.8	1.9	7.7	5.7	2.9
Non-Ag labour	1.1	7.6	5.7	5.7	12.3	6.4	8.3	24.6	10.9	8.2
Govt job	1.6	7.1	24.1	6.4	11.0	14.0	1.8	4.8	2.0	8.0
Self Employment	3.9	6.4	6.2	9.2	11.5	3.5	4.2	6.3	2.6	5.8
Rent installments	0.7	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.1
Remittances	0.9	3.3	1.8	0.9	0.5	0.6	0.0	1.5	0.0	1.0
Pension	1.5	2.5	6.0	0.4	1.0	3.2	0.5	0.1	0.5	1.8
Others Sector	3.5	4.8	6.4	17.1	6.6	14.3	14.3	11.7	11.1	9.8
Total Income (Rs.)	100	100	100	100	100	100	100	100	100	100
HH Income (Rs.)	**314437**	**158194**	**206193**	**214314**	**186765**	**240434**	**205296**	**152706**	**190558**	**207873**

Source: Primary Survey, 2019.

It was noticed that there was not much improvement in the source of income derived through agriculture and it was almost the same in current and previous year of all districts. Fishery, bee keeping, gramin artisans, rent installments and remittances are not of much significance in the district. It is clear from the table that the proportion of income derived through horticulture has shown considerable improvement in the current year than in previous year in all the districts.

IX: Livestock Status

Animal husbandry is an important allied activity of the farmers in the district. Almost all of the families keep milch and draft animals. The table 3.22 reveals that out of total sampled households, mostly 52.4 percent of household are having she-buffalo and 32.2 percent reporting caw. Sultanpur has highest no of buffalos followed by Jalaun and other district. Further, the table reveals that 32.2 percent of total household are having cow with Saharanpur at its highest followed by Mirzapur, Gorakhpur Sultanpur. 7.6 percent of household revealed of having bull whereas 10.6 percent of household revealed of keeping goat. However, most of the households maintained a milch animal.

Table 3.22: District Wise Distribution of Households Reporting Different Animals

District	Cow	Bull	Buffalo	Male buffalo	Goat	No. of HH
Saharanpur	55	5	56	13	6	100
Gorakhpur	37	6	36	4	4	100
Sultanpur	35	13	66	18	8	100
Jalaun	31	6	63	15	21	100
Hathras	31	9	58	18	6	100
Mirzapur	49	13	49	16	9	100
Amroha	34	9	62	17	9	100
Kannauj	9	3	41	7	21	100
Rampur	9	4	41	10	11	100
Total absolute no.	290	68	472	118	95	900
percent Share (YES)	(32.2)	(7.6)	(52.4)	(13.1)	(10.6)	(100.0)

Source: Primary Survey, 2019.

Table 3.23 reveals about the district wise average number of animals per households. It shows that on average per household in all the districts keep at least one or two milch and draft animals whereas in Mirzapur district, each household is having at least 4 animals and at least one cow on average basis. In Jalaun district, each household is having at least 3 animals and the percentage of she buffalo is higher than other animals. Thus, the table reveals that on average each household is keeping about 1 milch animal that are mostly she buffalos.

Figure 3.1: District wise Average Number of Animals per Households

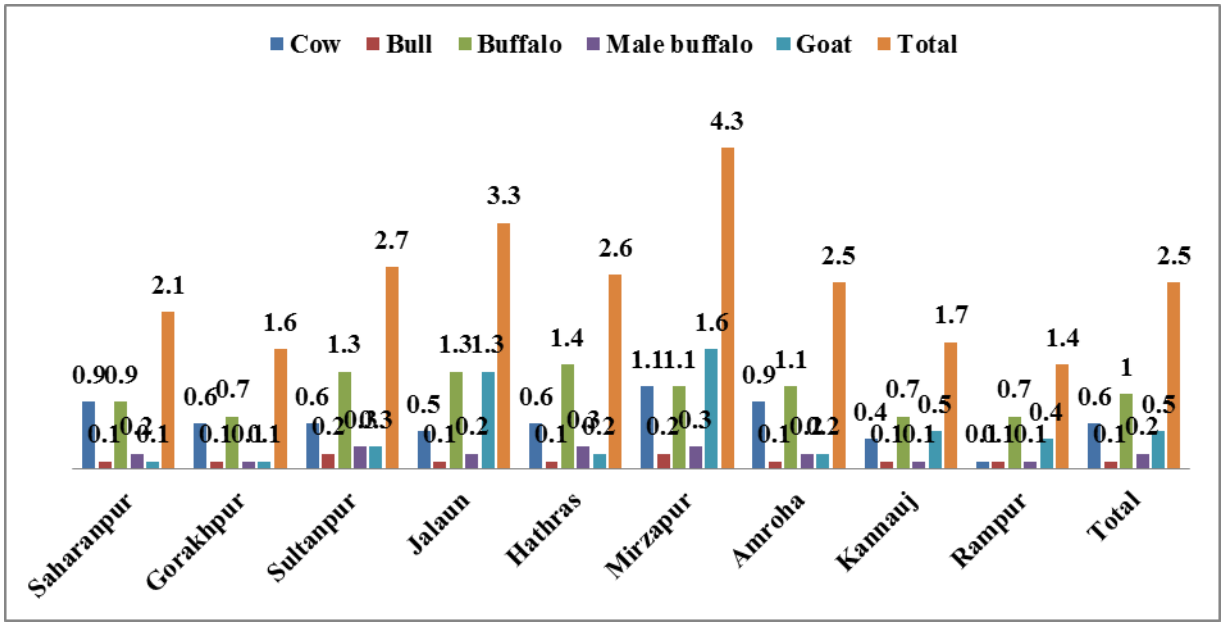


Table 3.25: District wise Average No of Animal per Households

District	Cow	Bull	Buffalo	Male buffalo	Goat	Total
Saharanpur	0.9	0.1	0.9	0.2	0.1	2.1
Gorakhpur	0.6	0.1	0.7	0.1	0.1	1.6
Sultanpur	0.6	0.2	1.3	0.3	0.3	2.7
Jalaun	0.5	0.1	1.3	0.2	1.3	3.3
Hathras	0.6	0.1	1.4	0.3	0.2	2.6
Mirzapur	1.1	0.2	1.1	0.3	1.6	4.3
Amroha	0.9	0.1	1.1	0.2	0.2	2.5
Kannauj	0.4	0.1	0.7	0.1	0.5	1.7
Rampur	0.1	0.1	0.7	0.1	0.4	1.4
Total	0.6	0.1	1.0	0.2	0.5	2.5

Source: Primary Survey, 2019.

Table 3.24 explains the average value of animal per households which clearly reveals about their economic condition. On same context, the table given below reveals that almost all the districts were having she buffalos with an average value of Rs. 34460 whereas it was seen that in Amroha district every household was having buffalo with an average value of Rs. 42000. Further, it was found that total average value of cow in all districts was Rs. 12978, where in Saharanpur every household was having cow with an average value of Rs.15000 and lowest value of cow was for Kannauj i.e. Rs.4978. It was also seen that every district was keeping Goat with an average value of Rs.3128 where Sultanpur takes the lead where every household was keeping at least one or two goats with an average value of Rs.9750. Hence, the table reveals that economically in all district every household was keeping at least one milch animal with an average value of Rs.34000.

Table 3.24: Average Value of Animal (in Rs.) per Households

District	Cow	Bull	Buffalo	Male buffalo	Goat	Total
Saharanpur	15049	22144	39529	30111	3545	25909
Gorakhpur	11508	2455	32121	27400	2500	19145
Sultanpur	11186	11429	32854	8048	9750	21264
Jalaun	11878	5556	36676	2524	2630	16886
Hathras	10362	6077	26978	17984	2706	19510
Mirzapur	14856	2023	33250	5225	2184	13618
Amroha	16319	12291	42000	19583	3490	26300
Kannauj	4978	3000	34338	2389	2784	15316
Rampur	12923	15714	34739	24583	4529	23004
Total	12978	7933	34460	13874	3128	19447

Source: Primary Survey, 2019.

X: Agricultural Machinery and Implements

The socio-economic status of households depends upon their assets ownership and their income level and ownership of agricultural equipment is one of them. The table 3.25 explains the details of households reporting ownership of different agricultural equipment and machineries. The table shows that small equipments is owned by all households in almost all districts. It was seen that only less than 30percent of households in all the districts owned modern equipment like sprayer, pump sets, *hairro*, and power tiller. About 15 percent of sampled households had Tractor and 18 percent owned tube well. It should be noticed that overall very small percentage i.e. 5 percent owned bullock cart and just 1.7 percent had plow. This reveals that growers in all the districts are mechanized and uses modern agricultural equipment either their own or on hired.

Table 3.25: District wise Distribution of Agricultural Equipment on sampled Households Reporting Positively

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Plow	1.0	0.0	5.0	1.0	0.0	3.0	4.0	0.0	1.0	1.7
Bullock Cart	17.0	0.0	3.0	1.0	5.0	0.0	13.0	0.0	8.0	5.2
Tractor	44.0	5.0	7.0	23.0	7.0	13.0	20.0	3.0	12.0	14.9
Power tiller	27.0	0.0	1.0	17.0	3.0	4.0	11.0	0.0	5.0	7.6
Hairo	42.0	5.0	6.0	14.0	7.0	8.0	12.0	3.0	12.0	12.1
Cultivator	38.0	5.0	6.0	21.0	7.0	13.0	12.0	3.0	11.0	12.9
Thresher	16.0	4.0	5.0	10.0	2.0	9.0	5.0	1.0	6.0	6.4
Pumpset	13.0	45.0	19.0	35.0	11.0	31.0	20.0	11.0	59.0	27.1
Spray equipments	36.0	18.0	32.0	25.0	25.0	29.0	45.0	22.0	21.0	28.1
Fodder Cutter	85.0	61.0	85.0	75.0	76.0	82.0	74.0	49.0	49.0	70.7
Small equipments	96.0	100.	99.0	97.0	99.0	99.0	100.	97.0	95.0	98.0
Storage	26.0	13.0	13.0	9.0	6.0	9.0	25.0	4.0	23.0	14.2
Oil wheat mill	1.0	2.0	3.0	0.0	0.0	0.0	1.0	0.0	2.0	1.0
Crop cutting eqp	8.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.2
Trolly	29.0	3.0	4.0	21.0	5.0	12.0	8.0	2.0	10.0	10.4
Tubewell	54.0	2.0	13.0	15.0	15.0	16.0	38.0	7.0	7.0	18.6
Others machines	3.0	0.0	0.0	0.0	1.0	0.0	0.0	2.0	0.0	0.7
No. of HH	100	100	100	100	100	100	100	100	100	900

Source: Primary Survey, 2019.

XI: Ownership of Durable Assets by Sampled Households:

The economic status of the households can be judged from the ownership of assets. Table 3.26 explains the households reported ownership of different durable items. It shows that maximum households in all the districts have most of the durable items such as cycle, mobile phones, utensils, etc. Ownership of T.V sets was also found to be quite common with 64.7 percent households owning a T.V sets. It was found that very low percent of households i.e. 4 percent of households own four wheeler in all the districts but most of households reported two wheelers. In terms of ownership of different durables position of Saharanpur was much better than all other districts.

Table 3.26: Households Reporting Durable Items: (percent YES)

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Jeep/Car	11.0	2.0	4.0	2.0	1.0	7.0	4.0	2.0	3.0	4.0
Scooter/Motorcycle	77.0	54.0	56.0	78.0	70.0	59.0	66.0	54.0	45.0	62.1
Cycle	88.0	95.0	100.0	99.0	95.0	97.0	92.0	98.0	94.0	95.3
Fan/Cooler	96.0	88.0	93.0	88.0	95.0	85.0	98.0	86.0	86.0	90.6
T.V./ Fridge/ Washing machine	89.0	46.0	66.0	68.0	63.0	67.0	68.0	57.0	58.0	64.7
Mobile / Computer	100.0	98.0	98.0	100	100.0	95.0	96.0	95.0	97.0	97.7
Furniture	100	74.0	86.0	100	98.0	79.0	100	98.0	99.0	92.8
Utensils	99.0	100	99.0	99.0	100	99.0	98.0	100	100	99.3
Other Assets	42.0	59.0	63.0	86.0	99.0	68.0	45.0	79.0	70.0	67.9
No. of HH	100	100	100	100	100	100	100	100	100	100

Source: Primary Survey, 2019.

Table 3.27 shows the financial assets owned by sampled households. Around 93.3 percent of the households have their savings in bank which shows that the main form of holding financial assets is in form of bank savings followed by gold/ silver jewelry. It was found that a very low percent of total households is saving in form of Kisan Vikas Patra and post offices.

Table 3.27: Households Reporting Mode of Savings & ownership of Financial Assets

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Saving in Bank	89.0	97.0	96.0	96.0	95.0	98.0	90.0	90.0	89.0	93.3
Post office	8.0	4.0	7.0	4.0	3.0	4.0	4.0	1.0	6.0	4.6
National Saving Letter / Kisaan Vikas Patra	10.0	2.0	4.0	3.0	1.0	2.0	3.0	1.0	3.0	3.2
Insurance	31.0	29.0	34.0	29.0	38.0	28.0	12.0	24.0	28.0	28.1
Jewelry	84.0	79.0	84.0	90.0	83.0	89.0	86.0	89.0	85.0	85.4
Other savings	27.0	48.0	48.0	49.0	81.0	56.0	46.0	61.0	42.0	50.9
No. of HH	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

XII: CONCLUSION

The chapter discusses the socio-economic condition of the growers engaged in the production of horticulture crops. It states that share of male population is higher in all the 9 districts. The percentage of General category respondents are less than OBC and SC category. The study confirmed that most of the people are self-employed and are engaged in agricultural activities. Regarding occupation, animal husbandry is an important allied activity of the farmers in the district. Almost all the households were found to keep milch and draft animals. The sampled households own about two milch animals on an average especially, she buffaloes. Over 95 percent households reported ownership of durable goods like cycle; mobile phones etc. and most of the households own a motorcycle. The horticulture contributes 37.9 percent of household income and 15 percent contributed through agriculture, whereas animal husbandry contributes 9.7 percent of household income. Since most of the repodents are from the marginal category, so around 9 percent of their income come from the agriculture and non-agriculture wages. It was also concluded that maximum 98 percent of households reported of having small equipment used in agriculture where 70 percent were having fodder cutter and other implements. It is important to notice that only 15 percent of the households reported of having tractor and 19 percent reported of having tube well.

Further, most of the people of sampled households were dependent on financial means of savings i.e. in banks. In short, the economic condition of the sampled households was not bad as reflected in indicators of assets ownership and income levels as compared to previous income of households. Hence, it can be said that if efforts are taken, the socio-economic condition of the horticultural growers can be improved.

Chapter 4

Area, Production and Productivity of Various Horticulture Crops - An Empirical Investigation

It is no doubt that the diverse climate of Uttar Pradesh is suitable for producing all kinds of horticultural crops. In fact, Uttar Pradesh holds a leading position in total production of horticultural crops in the India as for more than 92 percent of small holding farmers, horticultural crops are the main source of higher income, employment and nutrition per unit area (uphorticulture.gov.in). With the increasing importance of horticultural crops its producers are aware and are improving economic status by adopting the horticultural crops by optimum utilization of the available resources. Horticultural crops are diverse in nature be it all kinds of fruits, vegetables, flowers, medicinal and aromatic crops, root and tuber crops, spices and bee-keeping as well as mushroom cultivation as a subsidiary enterprise along with their processing and value addition.

Horticulture crops have an important contribution in the State's gross domestic production of the agricultural sector. Due to the increasing demand and important contribution in agricultural sector, horticultural crops are understood to have become an area of priority. For the commercialisation of horticultural crops and diversification of agriculture in the state, various programmes are being implemented within the state by the State government like expansion of area, rejuvenation of old mango, guava and aonla orchards, production of quality planting material and post harvest management etc (uphorticulture.gov.in).

Department of Horticulture and Food Processing of the State Government, Uttar Pradesh is making efforts for the continuous development of the horticulture crops by implementing various schemes for fruits, vegetables, potato, flowers, spices, medicinal and aromatic plants, betel-vine development along with subsidiary enterprises like bee-keeping, mushroom production, food processing and cultivation of betel-vine. Presently, various schemes are being implemented viz. Integrated Mission for Development of Horticulture, establishment of drip/sprinkler irrigation system, National Mission on Medicinal Plants, development of horticulture in schedule caste/tribe areas, Rashtriya Krishi Vikas Yojana and food processing development schemes in various districts. In the year 2015-16 in Bundelkhandand and Vidhya region, beneficiary farmers were given Rs.3,000 per hectare for three years per month as an incentive for establishing orchards in 0.2 hectare to 1 hectare with fencing to be done by

the beneficiary himself to establish new orchard in their own field and also to ensure the longevity in established orchards. Besides this, under Bundelkhand Special Package various programs were also implemented. At various departmental production unit grafted, seedling and ornamental plants are produced and are being made available to the takers at no profit-loss basis. Along with this, training programmes for bee keeping, betel development and mushroom production etc. are also being promulgated in various districts. Moreover, to promote the ensured development of food processing within the state, the Uttar Pradesh Food Processing Industry Policy -2012 has also been propagated by state government through interest subsidies, Quality & Certification Market Development, Research and Development and exports is promoted along with provision of various subsidies and concession for establishment of industries within the state. Furthermore, through promulgation of Uttar Pradesh Potato Development Policy-2014 various subsidy and concession are promoted for the planned development of main and important potato crop in the state. Evidently, by promulgation and implementation of such policies value addition could be ensured and which also results into the benefits to the producers and consumers, and hence forth the overall development of the state.

I: Area, Production and Productivity:

Horticulture has emerged as one of the major agricultural activities as there has been a substantial increase in both area and production of horticulture crops in the State of Uttar Pradesh. It is well recognized that the horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas. Thus, it is imperative to study the area, production and productivity of various horticulture crops in the State. In this context, the present chapter deals in detail the area and production of various horticulture crops on basis of the field survey in 9 selceted districts of 9 agro climatic zones of uttar Pradesh.

Table 4.1 shows district wise area under various horticulture crops as percent to total Gross Cropped area i.e. 1157 hectares. Food grains constitute nearly about 49.1 percent of area whereas total fruits crop constitute about 19.3 percent of area followed by about 16.3 percent of area by total vegetable crops in all districts. It is important to notice that total cash crops cover 10 percent of total gross cropped area where as the area covered by spices, flowers and other crops is much less in all the selected districts. This shows that food grains, fruits and vegetables dominate in selected districts as compared to flowers, spices and other crops.

Further, the table explains that out of total gross cropped area in Saharanpur, the maximum area is covered by fruits crop cultivation i.e. 46.6 percent followed by food grain cultivation i.e. 42.8 percent of total area. This shows that Saharanpur is purely a fruit belt area as percentage of total area under vegetable cultivation is very low i.e. only 6 percent. It is worth noting the the percentage of area under spices crop is merely zero. Further, among all the districts specialization in foodgrains cultivation is relatively higher than other crop cultivation. Gorakhpur is found to be specialized under food-grains followed by cash crops, vegetables and fruit crops. Kannauj nearly contributed 28.3 percent of total area under cash crops after food grain and the area under fruit crop is nil. Rampur is found to be a vegetable belt after food grain cultivation with no area to be found under flower cultivation.

Table 4.1: District wise Area under Different Horticulture Crops on Sampled Farms in Selected Districts of Uttar Pradesh

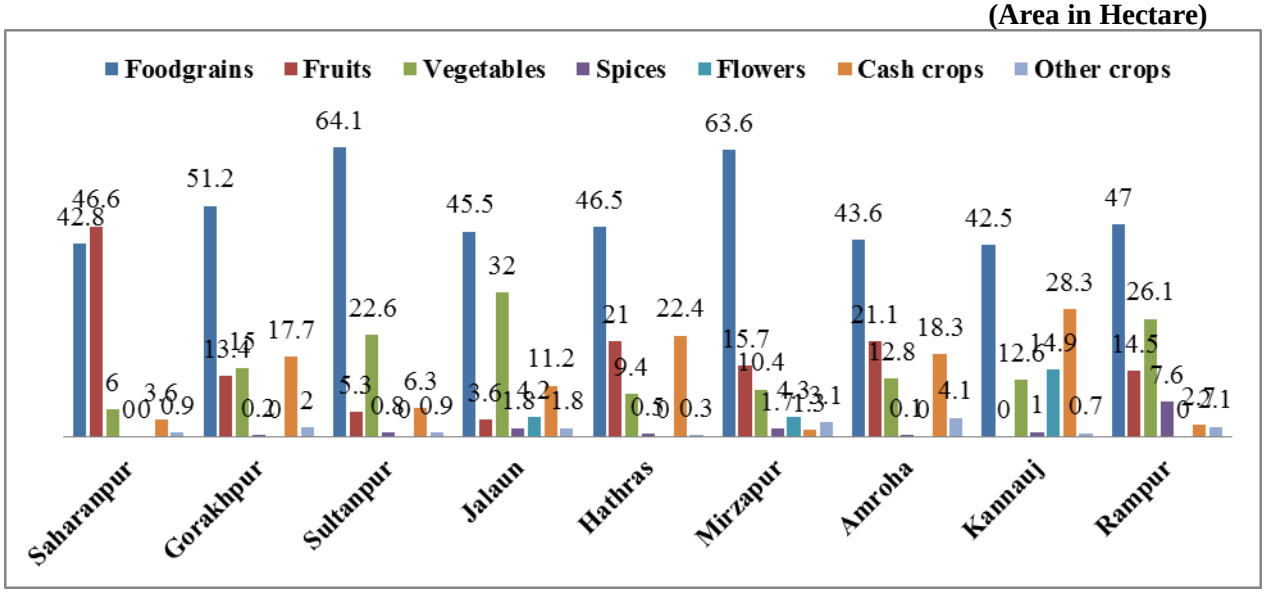
(Area in Hectare)

	Saharanpur	**Gorakhpur**	**Sultanpur**	**Jalaun**	**Hathras**	**Mirzapur**	**Amroha**	**Kannauj**	**Rampur**	**Total**
Foodgrains	105.20	48.40	64.40	84.80	49.60	86.00	46.40	25.60	58.00	568.00
	(42.8)	(51.7)	(64.1)	(45.5)	(46.5)	(63.6)	(43.6)	(42.5)	(47.0)	(49.1)
Fruits	114.40	12.40	5.20	6.80	22.40	21.20	22.40	0.00	18.00	222.80
	(46.6)	(13.4)	(5.3)	(3.6)	(21.0)	(15.7)	(21.1)	(0.0)	(14.5)	(19.3)
Vegetables	14.80	14.00	22.80	59.60	10.00	14.00	13.60	7.60	32.40	188.40
	(6.0)	(15.0)	(22.6)	(32.0)	(9.4)	(10.4)	(12.8)	(12.6)	(26.1)	(16.3)
Spices	0.08	0.16	0.80	3.32	0.48	2.32	0.16	0.60	9.36	17.28
	(0.0)	(0.2)	(0.8)	(1.8)	(0.5)	(1.7)	(0.1)	(1.0)	(7.6)	(1.5)
Flowers	0.00	0.00	0.00	7.72	0.00	5.76	0.00	9.08	0.00	22.56
	(0.0)	(0.0)	(0.0)	(4.2)	(0.0)	(4.3)	(0.0)	(14.9)	(0.0)	(1.9)
Cash Crops	8.92	16.52	6.32	20.76	23.76	1.68	19.40	17.16	3.32	117.84
	(3.6)	(17.7)	(6.3)	(11.2)	(22.4)	(1.3)	(18.3)	(28.3)	(2.7)	(10.2)
Other Crops	2.24	1.88	0.88	3.28	0.36	4.12	4.32	0.44	2.64	20.16
	(0.9)	(2.0)	(0.9)	(1.8)	(0.3)	(3.1)	(4.1)	(0.7)	(2.1)	(1.7)
Total Gross Cropped Area*	**246**	**94**	**100**	**186**	**106**	**135**	**106**	**61**	**124**	**1157**
	(100)	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**	**(100)**

Source: Primary Survey, 2019.
Note: Figures in brackets shows percentages to *Total Gross Cropped Area in hectare

Figure 4.1: District wise Area under Different Horticulture Crops in Selected Districts of Uttar Pradesh

(Area in Hectare)



The below table 4.2 explains the area, production and productivity of different horticulture crops on the basis of field survey of selected districts which shows that out of total gross cropped area, the food grain cultivation dominates amongst all horticulture crops followed by fruits, vegetables and cash crops. To our dismay we found that the area under spices and flower cultivation have very low proportion in total gross cropped area in selected districts. In the table given below, it is clear that maximum area is under foodgrain cultivation and is covered by Mirzapur and Sultanpur, whereas area under foodgrain is least in Saharanpur district. It also reveals that area under fruit cultivation is highest in Saharanpur whereas proportion of area under fruit crops is less for Sultanpur and Jalaun districts. The reason for such differences could be the agro-climatic conditions whici promote fruit crops and hinder thw cultivation of various vegetable crops. For vegetable crops it was found that the area was highest for Jalaun and lowest for Saharanpur.

Table 4.2: District wise Area, Production and Yield of Different Crops on Sampled farms in Selected Districts of Uttar Pradesh

		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
	A	105.2	48.4	64.4	84.8	49.6	86.0	46.4	25.6	58.0	568.0
	P	4593.0	1721.0	1942.0	2386.0	1529.0	2437.0	2125.0	1469.0	2691.0	20892.0
Foodgrains	**Y**	43.8	35.8	30.3	28.3	31.0	28.3	46.0	57.0	46.3	36.8
	A	114.4	12.4	5.2	6.8	22.4	21.2	22.4	0.0	18.0	222.8
	P	4940.0	1789.0	906.0	1002.0	2652.0	1086.0	62.0	0.0	0.0	12437.0
Fruits	**Y**	43.0	142.5	169.8	151.8	119.0	51.0	2.8	0.0	0.0	55.8

		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
	A	14.8	14.0	22.8	59.6	10.0	14.0	13.6	7.6	32.4	188.4
	P	3185.0	2048.0	3902.0	6130.0	1692.0	2388.0	3736.0	1347.0	9387.0	33814.0
Vegetables	**Y**	214.5	146.0	172.0	103.0	170.3	170.5	275.0	176.8	291.5	179.5
	A	0.1	0.2	0.8	3.3	0.5	2.3	0.2	0.6	9.4	17.3
	P	6.0	13.0	57.5	187.0	42.0	93.5	10.0	34.5	852.0	1295.5
Spices	**Y**	75.0	81.3	70.5	56.8	87.5	40.0	69.5	59.5	90.8	75.0
	A	0.0	0.0	0.0	7.7	0.0	5.8	0.0	9.1	0.0	22.6
	P	0.0	0.0	0.0	708.0	0.0	1392.0	0.0	669.5	0.0	2770.0
Flowers	**Y**	0.0	0.0	0.0	91.8	0.0	241.3	0.0	74.0	0.0	122.8
	A	8.9	16.5	6.3	20.8	23.8	1.7	19.4	17.2	3.3	117.8
	P	3962.5	2249.5	1527.6	3307.0	5263.0	385.0	10701.0	4472.0	1730.0	33597.0
Cash Crops	**Y**	444.3	136.3	241.8	159.5	221.5	227.5	551.3	260.5	521.0	285.3
	A	2.2	1.9	0.9	3.3	0.4	4.1	4.3	0.4	2.6	20.2
	P	310.0	256.0	102.3	408.0	45.0	554.0	1255.0	128.0	609.0	3667.3
Other Crops	**Y**	138.5	136.0	117.3	125.3	125.0	134.0	290.8	291.0	231.0	182.0
	A	**246.0**	**93.6**	**100.4**	**185.6**	**106.4**	**135.2**	**106.0**	**60.8**	**123.6**	**1157.2**
	P	**16996.0**	**8077.0**	**8436.0**	**14128.0**	**11223.0**	**8335.0**	**17889.0**	**8120.0**	**15269.0**	**108473.0**
Total	**Y**	**69.0**	**86.5**	**84.3**	**76.0**	**105.8**	**61.8**	**168.8**	**134.0**	**123.5**	**93.8**

Source: Primary Survey, 2019.

Note: A= Area (in Hectare), Production (in Qtl) and Productivity or Yield (in Qtl per Hectare)

Further, the given table also explains the production and productivity of different crops as it is important to analyze the productivity of various horticulture crops to determine the growth rate in particular district as productivity increase of any crops is an ultimate indicator of success of any district. In case of foodgrains crops, it is clear from the table that total productivity was highest in Kannauj i.e. 57 Qntl. per hectare followed by Rampur, Amroha and Saharanpur due to higher productivity of wheat, mustard and other pulses in selected district. The lowest yield for foodgrains crop was found in Sultanpur district due to less irrigation facility. Similarly, if productivity of fruit crops is seen it was found that Kannauj and Rampur do not contribute to the fruit crops whereas yield for fruit crop was highest in Sultanpur and Jalaun district. Further, under total vegetable crops, the yield was highest for Rampur and Kannauj and it was lowest for Jalaun. The reason for low productivity may be due to less irrigation facility in jalaun district.

Further, the table reveals that under spices crops the yield was highest in Rampur district followed by Gorakhpur where Garlic and Chilli was major spice crops. The productivity

under spice crop was least under Mirzapur. It is important to notice that yield under flower crops was highest only for Mirzapur i.e. 241.25 quintal Per hectare followed by Jalaun, Kannauj and yield was found to be nil for Saharanpur, Gorakhpur, Sultanpur, Hathras and Amroha. Under cash crop, the productivity was highest for cash crops in Amroha and lowest for Gorakhpur.

Table 4.3 shows area, production and productivity of different crops on sample farms and reveals that the proportion of total area under wheat and paddy cultivation is dominant in almost every district. The cultivation of wheat is highest in Jalaun followed by Saharanpur and Mirzapur whereas the proportion of area is lowest in Hathras and Jalaun. In Hathras, the area per hectare of other crops (pulses) cover almost 30.68 hectares area which comprises of jowar and bajara. In kannauj, the area of 15.48 hectare is covered by maize whereas chickpeas and mustard cover a very low area in Gorakhpur and Mirzapur respectively.

Further, if productivity of individual crops is compared to total food grain is observed, it was found that the productivity of wheat was highest in Amroha with 47.75 qntl per hectare followed by Rampur, Kannauj and Hathras. Further, it shows that highest area for paddy cultivation is for Saharanpur where the productivity from given area is 46.25 quintal per hecatre. It is important to notice that Kannauj has shown much improvement in paddy cultivation with 53.5 qntl per hectare with just 1.6 hecare of area under it. Area under Maize cultivation is highest in Kannauj which has productivity of 64.75 qntl per hecatre of yield. It worth noticing that area under pulses is highest for Hathras but productivity has not shown much improvement as it is seen that Amroha recorded low area has large productivity.

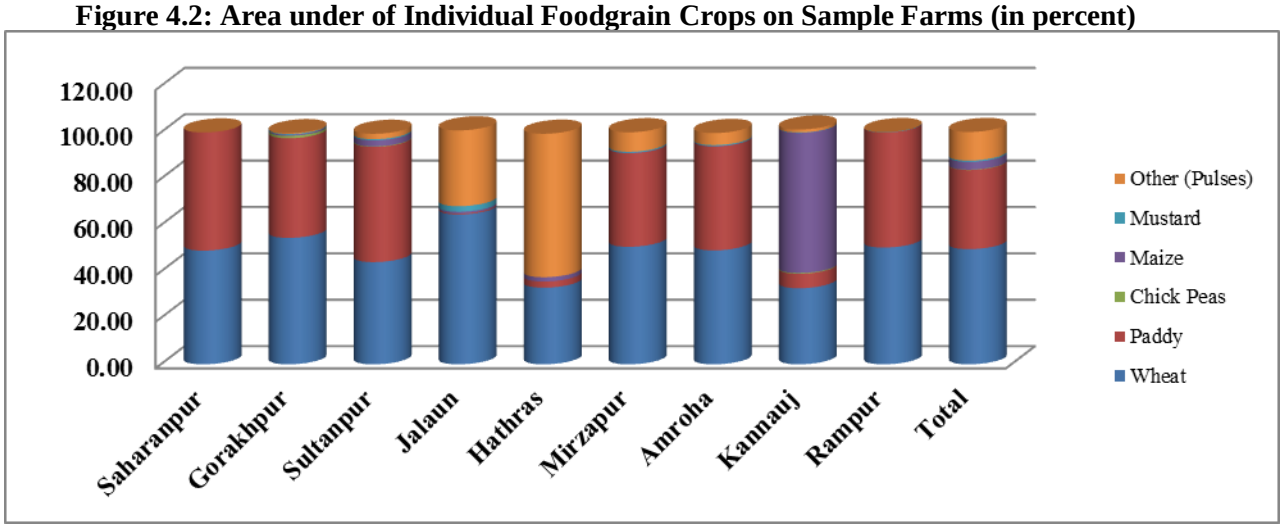
Table 4.3: Area, Production and Productivity of Individual Crops in Foodgrain on Sample Farms

Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Wheat	A	51.6	26.4	28.4	54.8	16.4	43.6	22.8	8.4	29.2	282.0
	P	2108.0	878.0	808.0	2118.0	679.0	1162.0	1096.0	378.0	1379.0	10605.0
	Y	41.0	33.3	28.3	38.5	41.3	26.8	47.8	44.8	47.3	37.8
Paddy	A	53.6	20.8	32.0	0.4	1.3	34.7	20.8	1.6	28.8	194.0
	P	2485.0	795.0	1036.0	6.0	60.0	1143.0	925.0	75.0	1311.0	7836.0
	Y	46.3	38.0	32.3	15.0	45.5	33.0	44.8	53.5	45.5	40.5

Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Chick Peas	A	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.8
	P	0.0	36.0	5.0	0.0	0.0	0.0	0.0	10.0	0.0	51.0
	Y	0.0	75.0	35.8	0.0	0.0	0.0	0.0	125.0	0.0	72.8
Maize	A	0.0	0.2	1.7	0.6	0.9	0.2	0.1	15.5	0.0	19.2
	P	0.0	7.0	55.0	12.0	28.0	4.0	3.0	1002.8	0.0	1112.0
	Y	0.0	29.3	32.8	20.0	30.5	25.0	37.5	64.8	0.0	58.0
Mustard	A	0.0	0.2	0.3	2.0	0.0	0.4	0.2	0.0	0.1	3.2
	P	0.0	4.5	7.5	29.0	0.0	4.0	4.0	1.5	2.0	53.0
	Y	0.0	28.3	23.5	14.3	0.0	10.0	21.8	37.5	25.0	16.3
Other (Pulses)	A	0.0	0.2	1.5	27.7	30.7	7.2	2.4	0.3	0.0	70.0
	P	0.0	2.0	30.3	227.0	761.5	124.0	96.8	2.0	0.0	1243.6
	Y	0.0	12.5	20.5	8.3	24.8	17.0	40.5	6.3	0.0	17.8
Total	**A**	**105.2**	**48.4**	**64.4**	**84.8**	**49.6**	**86.0**	**46.4**	**25.6**	**58.0**	**568.0**
	P	**4593.0**	**1721.0**	**1942.0**	**2386.0**	**1529.0**	**2437.0**	**2125.0**	**1469.0**	**2691.0**	**20892.0**
	Y	**43.8**	**35.8**	**30.3**	**28.3**	**31.0**	**28.3**	**46.0**	**57.0**	**46.3**	**36.8**

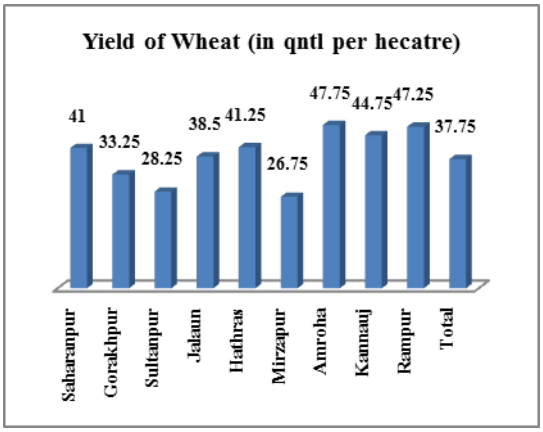
Source: Primary data
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

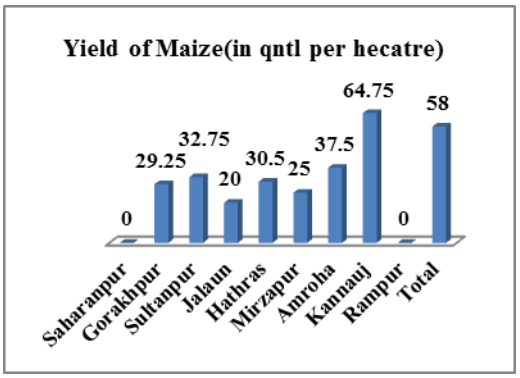
Figure 4.2: Area under of Individual Foodgrain Crops on Sample Farms (in percent)

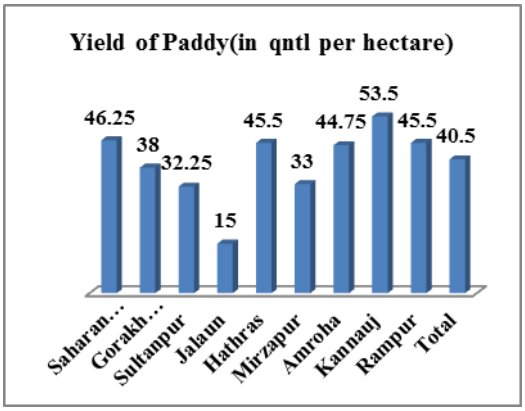


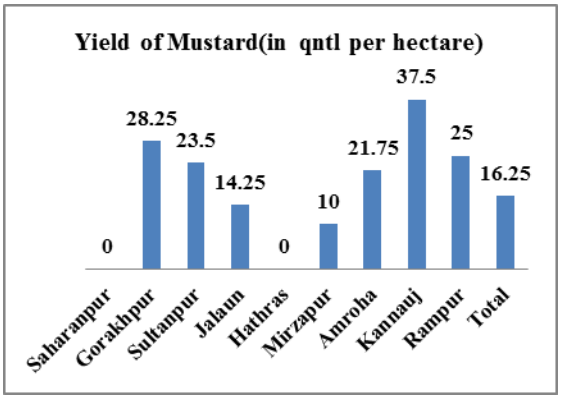
Source: Primary Survey, 2019.
Note: others include arhar, moong, masoor, gram, seasame, urad, jowar, bajara.

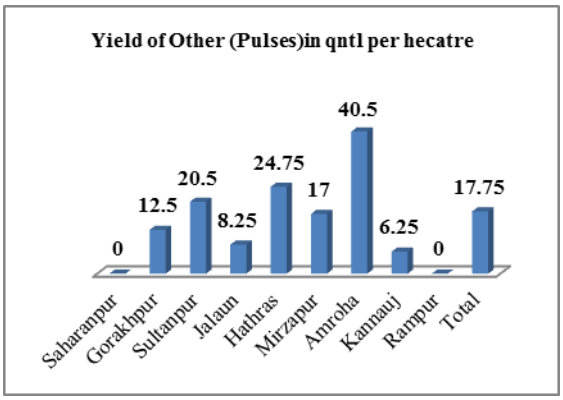
Figure 4.3: Yield of Individual Foodgrain Crops on Sample Farms (in percent)











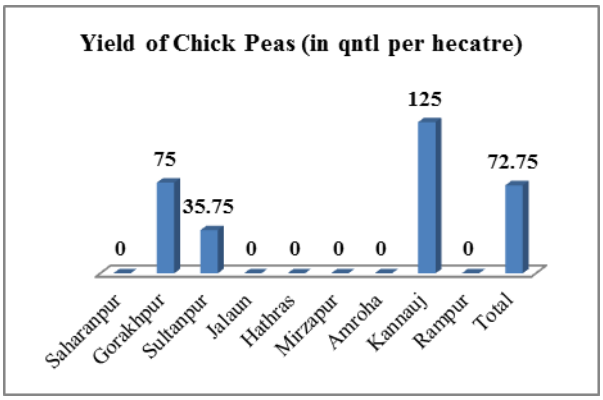


Table 4.4 shows area, production and productivity of Individual fruit crops on sample farms. The table highlights that the sample farms in Saharanpur, Gorakhpur and Amroha district cultivated mango as their major fruit as around 34 percent of the area was devoted to this fruit. The yield per hectare was estimated around 82.3 quintal per hectare in Saharanpur followed by 46.0 qntl per hectare in Gorakhpur and Jalaun with 44.5 qntl per hectare respectively. No doubt, favorable climatic conditions can be responsible for the growth of fruits in these districts. District Hathras has no area under Mango cultivation due to

unfavorable climatic conditions and major fruit in the same district was Guava as 39.2 percent of total area with productivity of 119.75 quintal per hectare was under its cultivation.

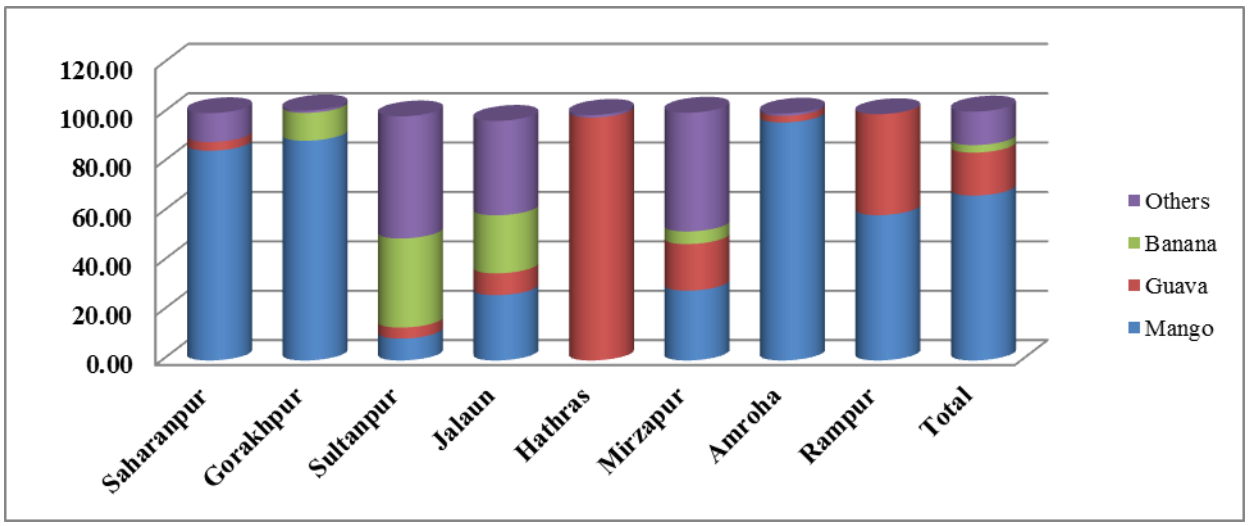
In addition to the above fruits mentioned, it was found that the Sultanpur cultivated banana and other fruits such as muskmelon, sugar apple, etc. The estimated yield was 252.5 quintal per hectare for others fruits in Sultanpur followed by Mirzapur where the area under 10.2 hectares was under other frouits and the yield was 82.3 qtl per hectares. Hence, the table reveals that yield of all fruit cultivation is much better in Sultanpur, Jalaun and Hathrus districts as compared to other sample district.

Table 4.4: Area, Production and Productivity of Individual Crops in Fruits on Sample Farms

Fruit Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Rampur	Total
Mango	**A**	97.2	11.0	0.6	1.8	0.0	6.0	21.6	10.6	148.8
	P	4476.0	910.0	20.0	80.0	0.0	0.0	20.0	0.0	5506.0
	Y	46.0	82.3	31.3	44.5	0.0	0.0	1.0	0.0	37.0
Guava	**A**	4.0	0.0	0.3	0.6	22.0	4.0	0.6	7.4	38.8
	P	80.0	0.0	67.0	6.0	2640.0	245.0	30.0	0.0	3068.0
	Y	20.0	0.0	223.3	10.0	119.8	61.3	50.0	0.0	78.8
Banana	**A**	0.0	1.4	2.6	1.6	0.0	1.1	0.0	0.0	6.8
	P	0.0	875.0	652.0	770.0	0.0	0.0	0.0	0.0	2297.0
	Y	0.0	625.0	250.8	481.3	0.0	0.0	0.0	0.0	344.5
Others	**A**	13.4	0.1	3.6	2.6	0.2	10.2	0.2	0.0	30.2
	P	384.0	4.0	902.0	146.0	12.0	840.9	12.0	0.0	2300.9
	Y	28.8	40.0	253.3	56.3	50.0	82.3	62.5	0.0	76.0
Total	**A**	**114.4**	**12.4**	**7.2**	**6.8**	**22.4**	**21.2**	**22.4**	**18.0**	**222.8**
	P	**4940.0**	**1789.0**	**906.0**	**1002.0**	**2652.0**	**1086.0**	**62.0**	**0.0**	**12437.0**
	Y	**43.0**	**142.5**	**169.8**	**151.8**	**119.0**	**51.0**	**2.8**	**0.0**	**55.8**

Source: Primary data
Note: A= Area (In Hectare), Production (In Qtl) and Productivity or Yield (In Qtl per Hectare)

Figure 4.4: Percent Area under individual Fruit crops in Selected Districts of Uttar Pradesh



Source: Primary data
Note: other fruits include litchi, watermelon, muskmelon, papaya, sugarapple, lemone, pomengrate, apple, raspberry, peach.

Figure 4.5: Yield of individual Fruit crops in Selected Districts of Uttar Pradesh (in qtl. Per hect)

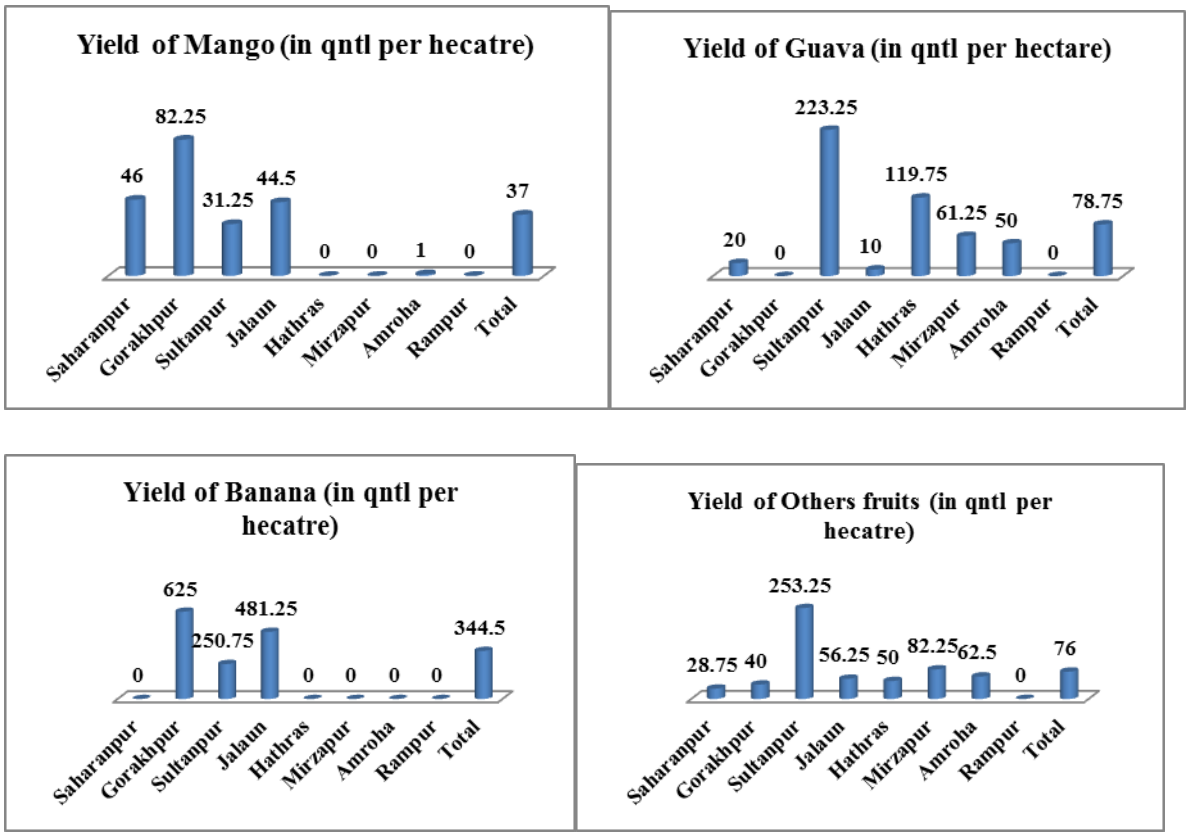


Table 4.6 examines the area, production and productivity of individual vegetable crops on sample farms where it was found that in Saharanpur district, cauliflower was the major vegetable cultivated as it covered maximum 37.04 percent hectare of area with its

productivity of 203 quintal per hectare which was followed by cabbage with 1.95 hectare of area and productivity of 383.0 quintal per hectare.

Further, in Jalaun district, it was found that area under other crops (green peas, beans, arbi, spinach etc) was maximum i.e. 30.63 hectare of area as it mainly covered green pea production with productivity of 72.75 qntl per hectare. It is important to notice that the maximum yield was for other crops in Kannauj with its productivity of 416.75 qntl per hectare from 0.12 hectares area under it. Tomato was found to be major crop cultivated in Kannauj as it covered almost 35.36 hectares of area with 181.0 quintal per hectare of productivity.

Lady finger was the major vegetable crop in Hathras as area covered was 5.32 hectare with yield of 112.0 quintal per hectare. The maximum productivity of lady finger was highest in Saharanpur i.e. 227.25 quintal per hectare from just 0.12 hectare of land under its cultivation. Overall, the table states that the total yield under vegetable crops was much better in Rampur and Amroha districts.

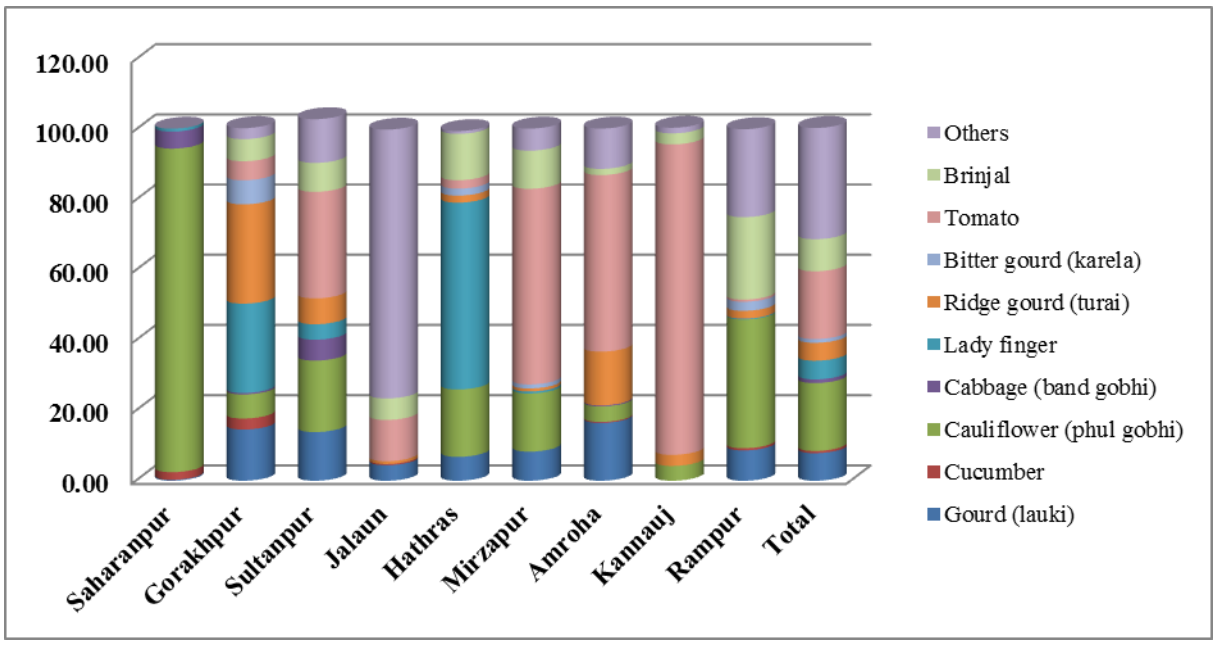
Table 4.5: Area, Production and Productivity of Individual Vegetable Crops on Sample Farms in Uttar Pradesh

Vegetable Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Gourd (lauki)	A	0.04	2.04	3.16	2.64	0.68	1.16	2.24	0.00	2.80	14.80
	P	15.00	358.00	668.00	363.00	285.00	115.00	767.00	0.00	1596.00	4167.00
	Y	375.00	175.25	212.75	138.50	419.00	100.50	343.00	0.00	573.25	283.75
Cucumber	A	0.32	0.44	0.00	0.20	0.00	0.00	0.04	0.00	0.20	1.20
	P	98.00	150.00	0.00	30.00	0.00	0.00	15.00	0.00	40.00	333.00
	Y	295.25	341.00	0.00	150.00	0.00	0.00	375.00	0.00	200.00	274.75
Cauliflower (phul gobhi)	A	13.64	0.96	4.64	0.00	1.92	2.32	0.60	0.32	11.88	36.40
	P	2767.00	160.00	876.00	0.00	537.00	367.00	75.00	33.00	3630.00	8445.00
	Y	203.00	170.25	189.50	0.00	282.75	157.50	125.00	103.25	305.50	233.25
Cabbage (band gobhi)	A	0.72	0.06	1.36	0.00	0.00	0.00	0.04	0.00	0.00	2.00
	P	275.00	16.00	353.00	0.00	0.00	0.00	25.00	0.00	0.00	669.00
	Y	382.00	266.75	256.50	0.00	0.00	0.00	781.25	0.00	0.00	305.75
Lady finger	A	0.12	3.56	1.00	0.00	5.32	0.08	0.00	0.00	0.08	10.00
	P	30.00	381.20	96.50	0.00	596.00	10.00	0.00	0.00	7.00	1121.00
	Y	227.25	106.75	95.75	0.00	112.00	125.00	0.00	0.00	87.50	110.00

Ridge gourd (turai)	**A**	0.00	3.96	1.68	0.48	0.20	0.12	2.08	0.24	0.72	9.60
	P	0.00	651.00	238.00	101.00	8.00	15.00	458.00	19.50	214.00	1705.00
	Y	0.00	164.00	142.75	219.50	40.00	125.00	221.50	88.75	290.75	180.50
Bitter gourd (karela)	**A**	0.00	0.96	0.00	0.00	0.20	0.16	0.00	0.00	0.84	2.00
	P	0.00	127.00	0.00	0.00	5.00	8.00	0.00	0.00	45.50	186.00
	Y	0.00	130.75	0.00	0.00	25.00	50.00	0.00	0.00	54.75	85.75
Tomato	**A**	0.00	0.76	6.92	7.00	0.24	7.80	6.84	6.72	0.20	36.40
	P	0.00	95.00	1134.00	1353.00	36.00	1614.00	2147.00	1216.00	70.00	7665.00
	Y	0.00	128.50	163.75	193.25	150.00	207.50	314.50	181.00	350.00	210.50
Brinjal	**A**	0.00	0.88	1.88	3.64	1.32	1.52	0.24	0.24	7.60	17.20
	P	0.00	70.00	261.00	962.00	223.00	201.00	50.00	28.00	2112.00	3907.00
	Y	0.00	81.50	140.25	264.25	169.00	133.00	208.25	116.75	277.50	226.00
Others	**A**	0.00	0.44	2.84	45.64	0.08	0.88	1.56	0.12	8.12	59.68
	P	0.00	40.00	328.00	3321.00	2.00	58.00	199.20	50.00	1702.00	5700.00
	Y	0.00	91.00	114.75	72.75	25.00	66.00	129.00	416.75	209.25	95.50
Total	**A**	**14.80**	**14.00**	**22.80**	**59.60**	**10.00**	**14.00**	**13.60**	**7.60**	**32.40**	**188.40**
	P	**3185.00**	**2048.00**	**3902.00**	**6130.00**	**1692.00**	**2388.00**	**3736.00**	**1347.00**	**9387.00**	**33814.00**
	Y	**214.50**	**146.00**	**172.00**	**103.00**	**170.25**	**170.50**	**275.00**	**176.75**	**291.50**	**179.50**

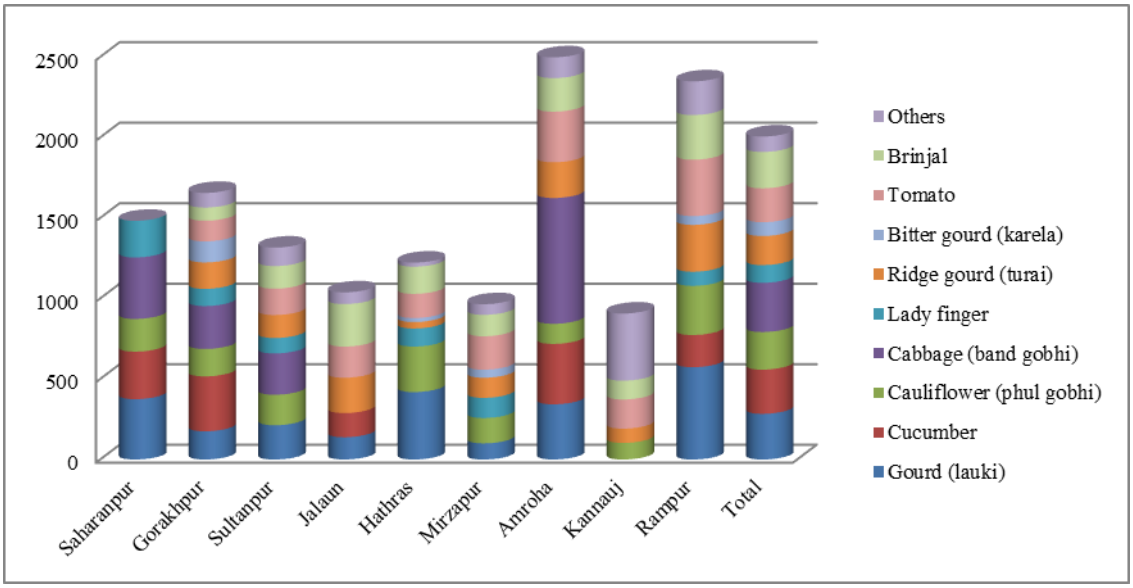
Source: Primary Survey, 2019.
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

Figure 4.6: Area under Individual Vegetable Crops in Selected Districts of Uttar Pradesh (inpercent)



Source: Primary data
Note: Other crops include green peas, arbi, beans, spinach, raddish, pumpkin, soya, mint, gawar, carrot, capsicum.

Figure 4.7: Yield of Individual VegetableCrops in Selected Districts of Uttar Pradesh (in Qtl. Per hec)



Source: Primary data
Note: Other crops include green peas, arbi, beans, spinach, raddish, pumpkin, soya, mint, gawar, carrot, capsicum.

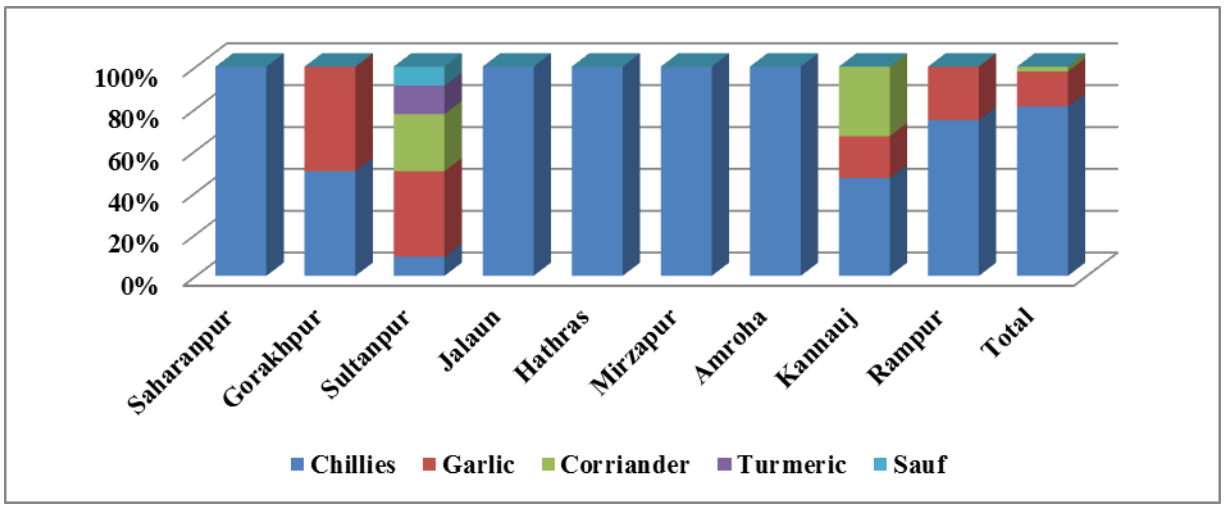
Table 4.6: Area, Production and Productivity of Individual Crops in Spice-Crop on Sample Farms

Spice Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Chillies	**A**	0.08	0.08	0.08	3.32	0.48	2.32	0.16	0.28	7.00	13.60
	P	6.00	6.00	12.00	187.00	42.00	93.50	10.00	17.00	696.00	1070.00
	Y	75.00	75.00	150.00	56.75	87.50	40.00	69.50	65.50	99.50	77.75
Garlic	**A**	0.00	0.08	0.36	0.00	0.00	0.00	0.00	0.12	2.40	2.80
	P	0.00	7.00	25.50	0.00	0.00	0.00	0.00	4.50	156.00	193.00
	Y	0.00	87.50	74.25	0.00	0.00	0.00	0.00	37.50	65.25	65.75
Corriander	**A**	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.20	0.00	0.40
	P	0.00	0.00	7.00	0.00	0.00	0.00	0.00	13.00	0.00	20.00
	Y	0.00	0.00	31.75	0.00	0.00	0.00	0.00	65.00	0.00	47.50
Turmeric	**A**	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	P	0.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00
	Y	0.00	0.00	107.25	0.00	0.00	0.00	0.00	0.00	0.00	107.25
Sauf	**A**	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	P	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	Y	0.00	0.00	16.75	0.00	0.00	0.00	0.00	0.00	0.00	16.75
Total	**A**	**0.08**	**0.16**	**0.88**	**3.32**	**0.48**	**2.32**	**0.16**	**0.60**	**9.36**	**17.28**
	P	**6.00**	**13.00**	**57.50**	**187.00**	**42.00**	**93.50**	**10.00**	**34.50**	**852.00**	**1295.00**
	Y	**75.00**	**81.25**	**70.50**	**56.75**	**87.50**	**40.00**	**69.50**	**59.50**	**90.75**	**75.00**

Source: Primary data
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

Examination of table 4.6 shows the area and its productivity of total individual spice crops on sample farms in selected districts of Uttar Pradesh. The table reveals that chilli was the major spice crop in almost most of the selected districts as it covered almost 13.60 hectare of total area under total spice crops of 17.28 hectares. Further, table reveals that chilli was the major spice crop in Rampur, Jalaun and Mirzapur districts. 2.80 hectare of area is covered by Garlic with highest productivity in Gorakhpur district followed by Sultanpur and Kannauj. Cultivation of turmeric covered very low area and is found only in Sultanpur district with its yield of 107.25 quintal per hectare. Sauf and Coriander contributes to very low area of cultivation with less than 0.4 hectare of land and its productivity is nearly 47.5 quintal per hectare on average. Hence the above table reveals that chilli and garlic was the major spice crops in selected sample district as compared to Coriander, Turmeric and Sauf.

Figure 4.8: Area under Individual Spice Crops in Selected Districts of Uttar Pradesh (in percent)



Source: Primary data

Figure 4.9: Yield of Individual Spice Crops in Selected Districts of Uttar Pradesh (in percent)

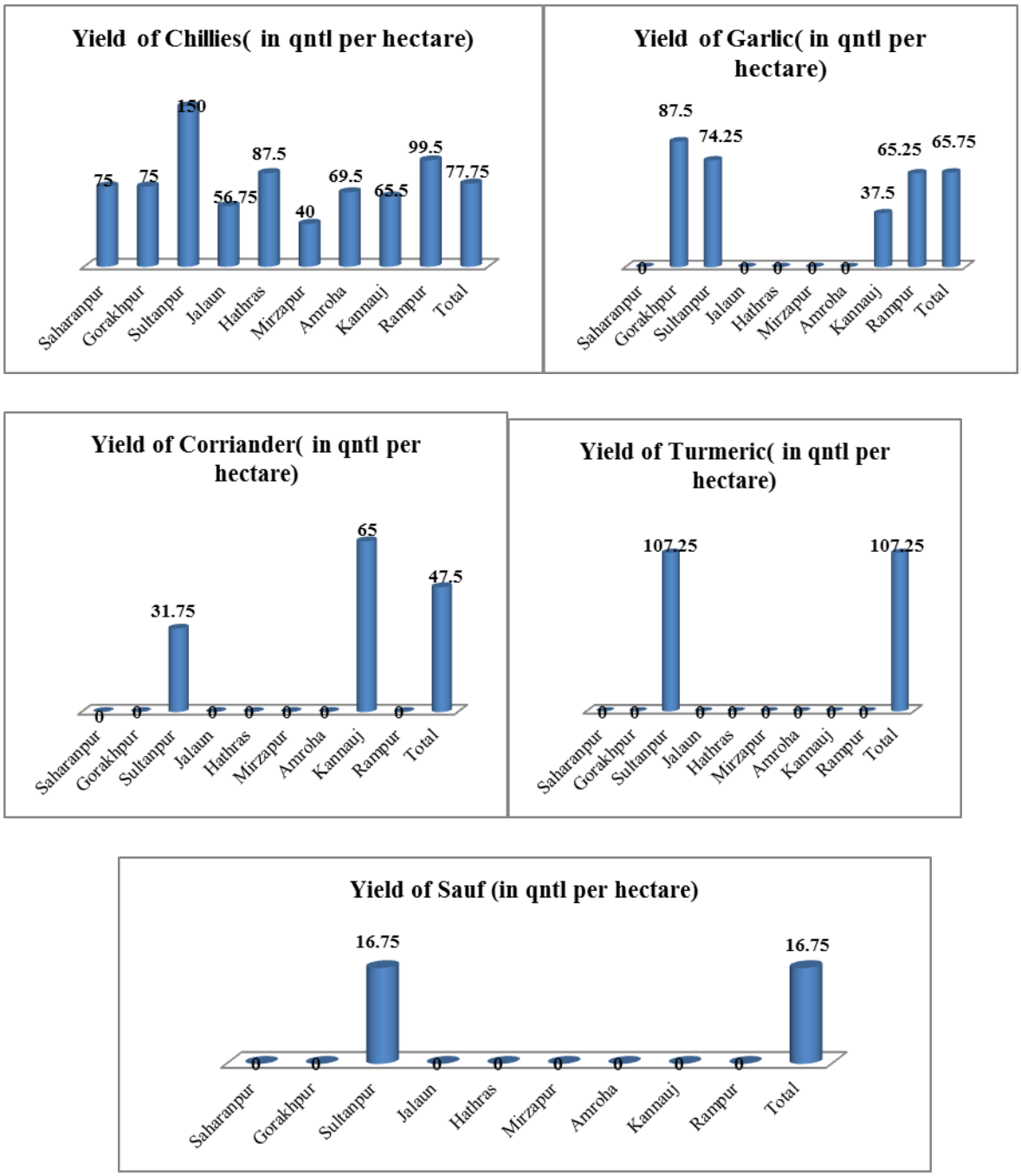


Table 4.7 shows the area, and production of different flower cultivation in sample districts. The table states that the cultivation of flowers was only found in three districts of the selected sample farms i.e. Jalaun, Mirzapur, Kannauj. It was found that the cultivation of rose was highest in Kannauj district i.e. 4.88 hectare of area followed by Mirzapur (1.4 hectare of area) and Jalaun (0.2 hectare) with 84.75 quintal per hectare productivity and 277.75 qntl per hectare respectively.

Among all the flower cultivation, the area of marigold cultivation was highest with its productivity at 122.5 quintal per hectare whereas, it was seen that kannauj has no role in marigold cultivation whereas the area was highest in Jalaun followed by Mirzapur. Jasmine flower cultivation was major flower crop in Kannauj district with 63.25 quintal per hectare yield. Other than this flower cultivation, many other flowers such as gladiolus, Rajnikantha etc has very low proportion of area and yield in selected sample farm. This reveals that rose, marigold and jasmine was the major flower crop in the selected sample farms. However, an effort should be made to raise the yield of popular flowers in the district by making all efforts.

Table 4.7: Area, Production and Productivity of Individual Crops in Flowers on Sample Farms

Flowers	APY	Jalaun	Mirzapur	Kannauj	Total
Rose	**A**	0.20	1.40	4.88	6.40
	P	7.00	391.00	414.00	812.00
	Y	35.00	277.75	84.75	125.25
Marigold	**A**	6.40	3.32	0.00	9.60
	P	545.00	646.00	0.00	1191.00
	Y	85.25	194.25	0.00	122.50
Gladiolus	**A**	0.32	0.00	0.00	0.40
	P	33.00	0.00	0.00	33.00
	Y	281.25	0.00	0.00	281.25
Rajnigandha	**A**	0.64	0.00	0.00	0.80
	P	78.00	0.00	0.00	78.00
	Y	122.00	0.00	0.00	122.00
Guldaudi	**A**	0.16	0.00	0.00	0.00
	P	45.00	0.00	0.00	45.00
	Y	281.25	0.00	0.00	281.25
Mehendi	**A**	0.00	0.00	0.80	0.80
	P	0.00	0.00	42.00	42.00
	Y	0.00	0.00	52.50	52.50
Jasmine	**A**	0.00	0.00	3.40	3.20
	P	0.00	0.00	213.50	214.00
	Y	0.00	0.00	63.25	63.25
Udahul	**A**	0.00	0.64	0.00	0.80
	P	0.00	238.00	0.00	238.00
	Y	0.00	372.00	0.00	372.00
Tagarh	**A**	0.00	0.40	0.00	0.40
	P	0.00	117.00	0.00	117.00
	Y	0.00	292.50	0.00	292.50
Total	**A**	**7.72**	**5.76**	**9.08**	**22.56**
	P	**708.00**	**1392.00**	**669.50**	**2769.50**
	Y	**91.75**	**241.25**	**74.00**	**122.75**

Source: Primary Survey, 2019.
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

Figure 4.10: Area under Individual Flowers on Sampled Farms in Selected Districts of Uttar Pradesh (in percent)

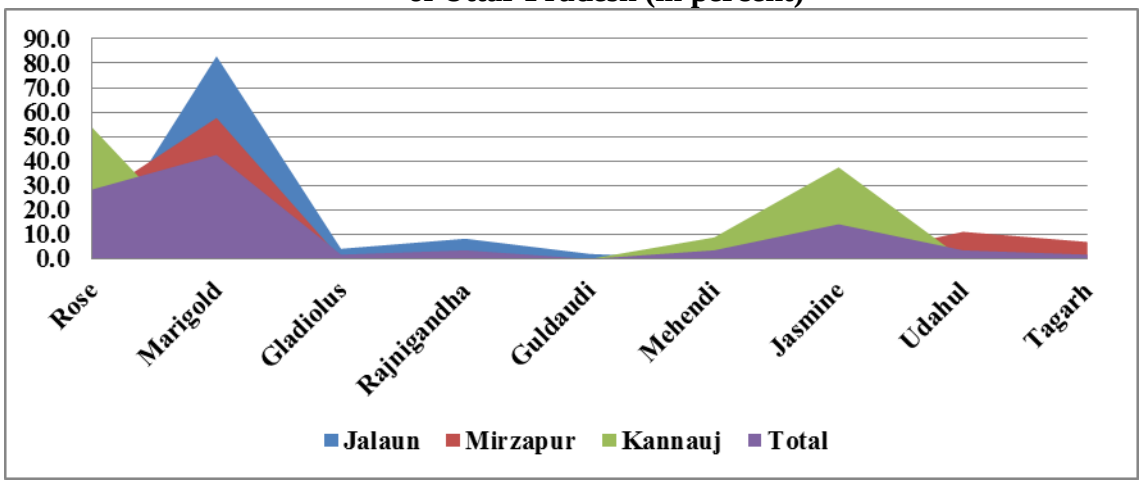


Figure 4.11: Yield of Individual Flowers on Sampled Farms in Selected Districts of Uttar Pradesh (in Qtl. Per Hec)

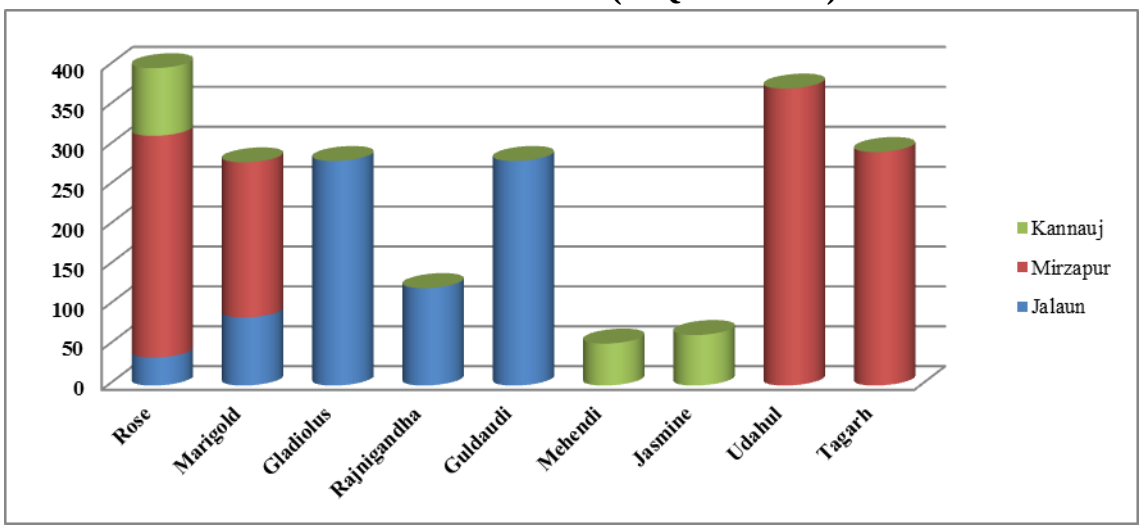


Table 4.8 explains the area, production and its yield of individual crops in cash crops on sample farms which shows that potato was the major cultivation in Hathras and Mirzapur followed by Sultanpur and Kannauj. The yield per hectare of potato was 221.5 quintal per hectare and 238.75 quintal per hectare in Hathras and Mirzapur districts. It was further seen that Sugarcane was the major cash crop in Saharanpur district followed by Amroha and Rampur. It was found that in same district, the yield per hectare was 456 quintal per hectare which may be due to favorable climatic condition required for production of sugarcane. Peanuts was only found to cover by Gorakhpur and Onion was found to be major cash crop in Jalaun district which cover maximum area under onion cultivation with yield of 133.5 quintal per hectare. This table reveals that cash crop cultivation was highest for potato crop followed

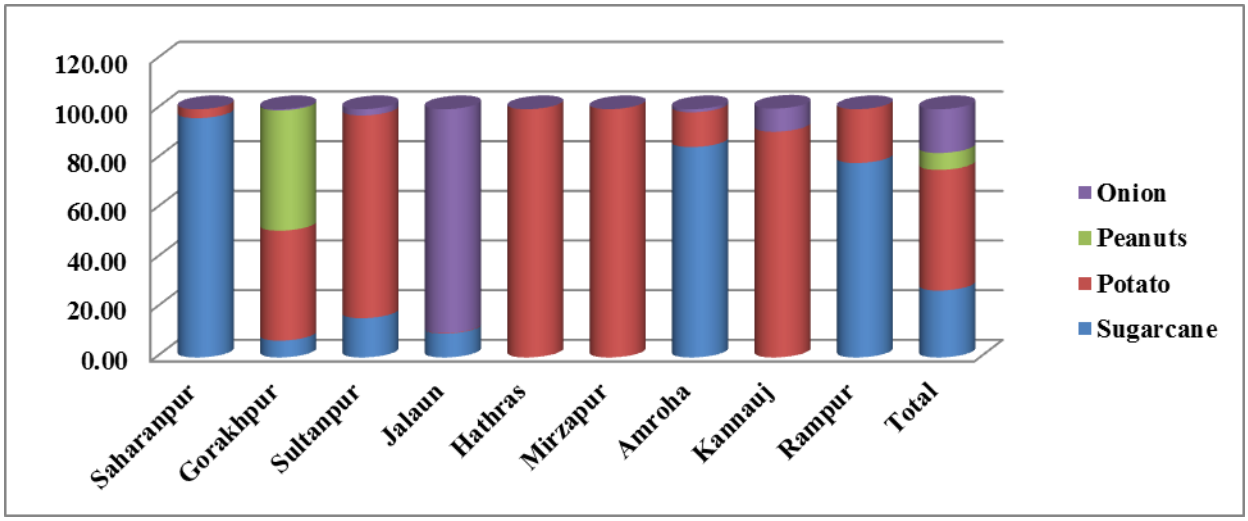
by Sugarcane and onion in sample farms. The reason for yield increase affects the production of cash crops in selected sample farm.

Table 4.8: Area, Production and Productivity of Individual Crops in Cash-Crop on Sample Farms

Cash crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Sugarcane	A	8.60	1.12	1.00	2.00	0.00	0.00	16.44	0.00	2.60	31.76
	P	3922.00	744.00	510.00	800.00	0.00	0.00	9888.00	0.00	1590.00	17454.50
	Y	456.00	664.25	510.00	400.00	0.00	0.00	601.75	0.00	611.50	549.75
Potato	A	0.32	7.32	5.16	0.04	23.76	1.68	2.72	15.60	0.72	57.28
	P	40.00	1326.00	1016.00	6.00	5263.00	385.00	773.00	3720.00	140.00	12669.00
	Y	125.00	181.25	197.25	300.00	221.50	227.50	283.25	238.75	194.50	221.25
Peanuts	A	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
	P	0.00	169.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	169.50
	Y	0.00	21.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.25
Onion	A	0.00	0.08	0.16	18.72	0.00	0.00	0.24	1.60	0.00	20.80
	P	0.00	10.00	1.60	2501.00	0.00	0.00	40.00	752.00	0.00	3304.60
	Y	0.00	125.00	9.75	133.50	0.00	0.00	161.25	476.00	0.00	159.00
Total	**A**	**8.92**	**16.52**	**6.32**	**20.76**	**23.76**	**1.68**	**19.40**	**17.16**	**3.32**	**117.84**
	P	**3962.00**	**2249.00**	**1527.00**	**3307.00**	**5263.00**	**385.00**	**10701.00**	**4472.00**	**1730.00**	**33597.60**
	Y	**444.25**	**136.25**	**241.75**	**159.50**	**221.50**	**227.50**	**551.25**	**260.50**	**521.00**	**285.25**

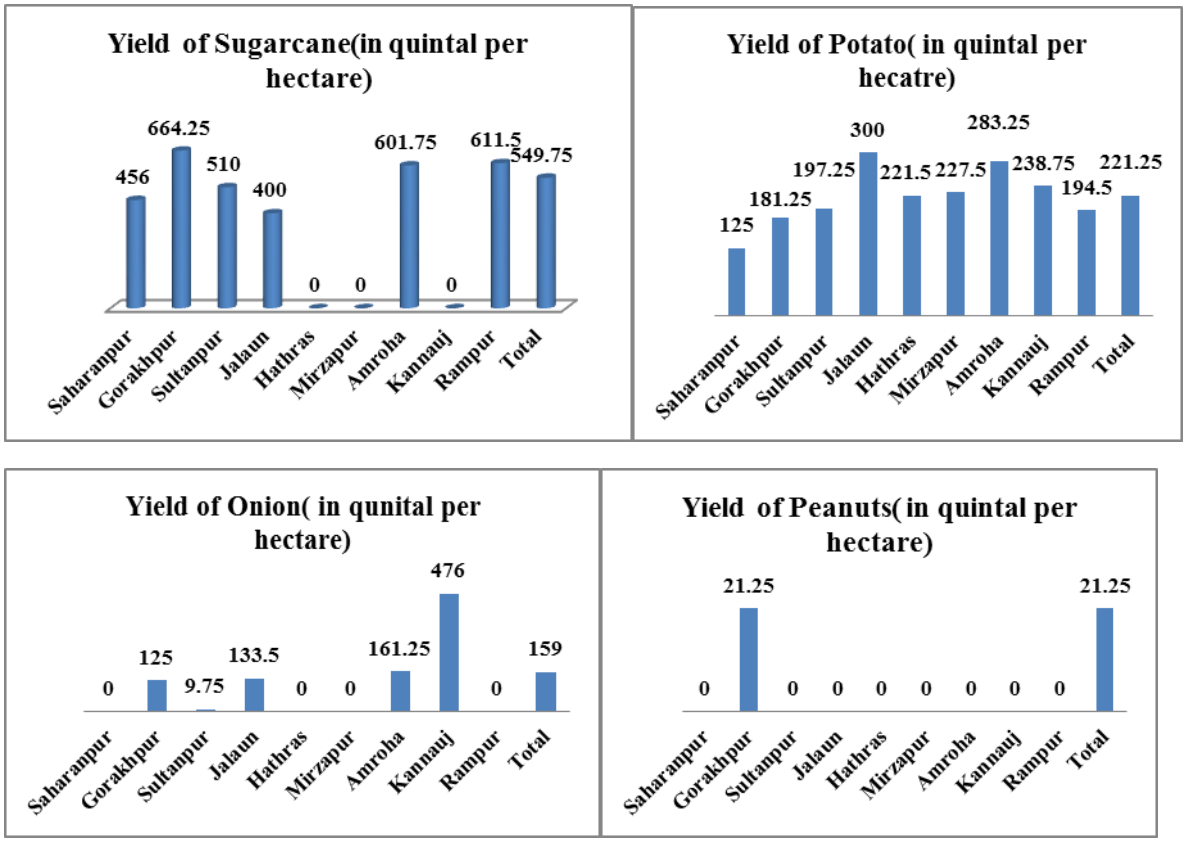
Source: Primary Survey, 2019.
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

Figure 4.12: Area Under Individual Cash Crops on Sample farms in Selected Districts of Uttar Pradesh (in percent)



Source: Primary data

Figure 4.13: Yield of Individual Cash Crops on Sample farms in Selected Districts of Uttar Pradesh (in Qtl. Per Hect.)



The explanation for table 4.9 states that the area, production and yield of individual crops Chara, Kapas and Barsin crops are included in other crops category on sampled farms. The

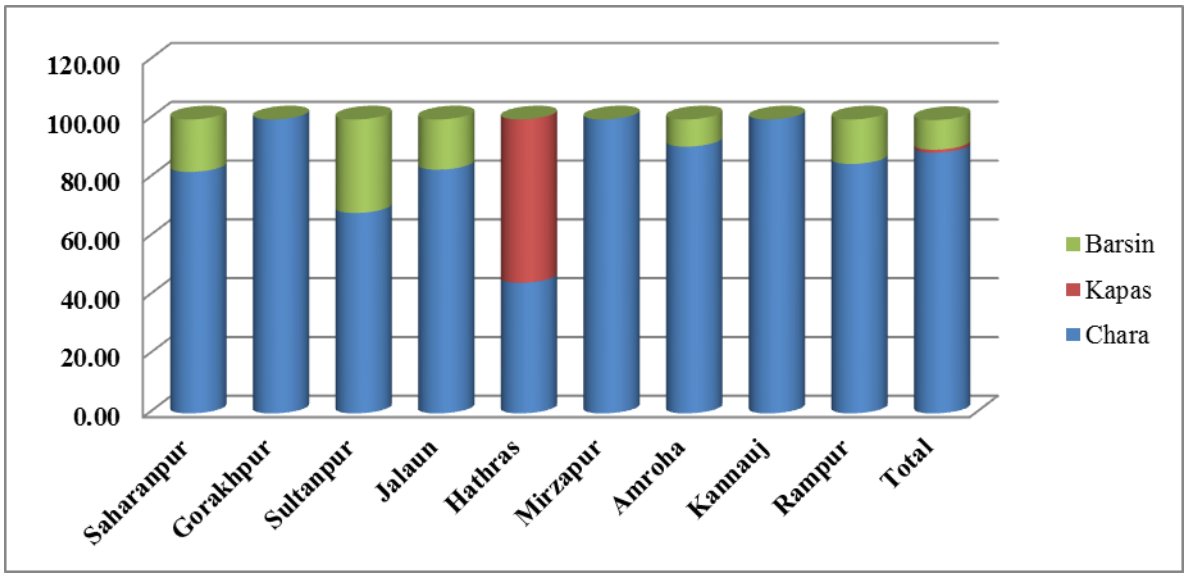
graph 4.10 and 4.11 shows area under different categories of Other Crops and also yield thereof. It shows that the maximum area is contributed by Chara in almost all selected sampled farms but in Hathras, the proportion of area of Kapas was found to be higher as compared to area under Chara. Mirzapur, Gorakhpur and Rampur fully contribute towards Chara. The area of barsin is much better in Sultanpur district. Hence, the table reveals that overall proportion of Chara is higher than Kapas and Barsin in almost most of the selected sampled farms. It shows the total area under other crops contribute to 20.16 hectare of area with productivity of 182.00 quintal per hectare.

Table 4.9: Area, Production and Productivity of Individual Crops in Other crops on Sample Farms

Other Crops		Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Chara	**A**	1.84	1.88	0.60	2.72	0.16	4.12	3.92	0.44	2.24	17.88
	P	220.00	256.00	85.80	350.00	42.00	554.00	1195.00	128.00	569.00	3399.80
	Y	119.50	135.75	148.00	129.75	262.50	134.00	305.00	291.00	254.50	190.00
Kapas	**A**	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.20
	P	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	3.00
	Y	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	15.00
Barsin	**A**	0.40	0.00	0.28	0.56	0.00	0.00	0.40	0.00	0.40	2.04
	P	90.00	0.00	16.50	58.00	0.00	0.00	60.00	0.00	40.00	264.50
	Y	225.00	0.00	56.50	103.50	0.00	0.00	150.00	0.00	100.00	129.00
Total	**A**	**2.24**	**1.88**	**0.88**	**3.28**	**0.36**	**4.12**	**4.32**	**0.44**	**2.64**	**20.16**
	P	**310.00**	**256.00**	**102.30**	**408.00**	**45.00**	**554.00**	**1255.00**	**128.00**	**609.00**	**3667.30**
	Y	**138.50**	**136.00**	**117.25**	**125.25**	**125.00**	**134.00**	**290.75**	**291.00**	**231.00**	**182.00**

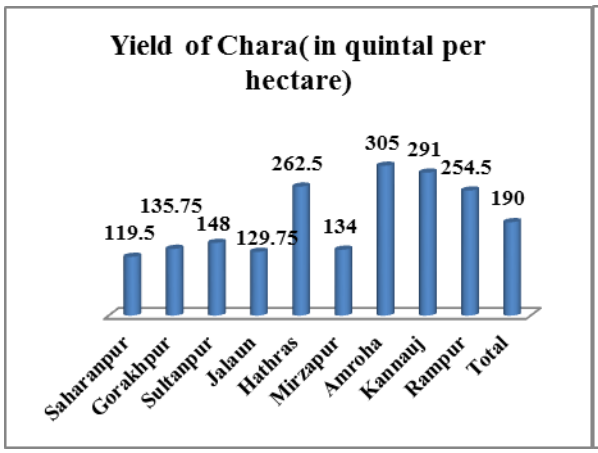
Source: Primary Survey, 2019.
Note: A= Area (In hectare), Production (In Qtl) and Productivity or Yield (In Qtl per hectare)

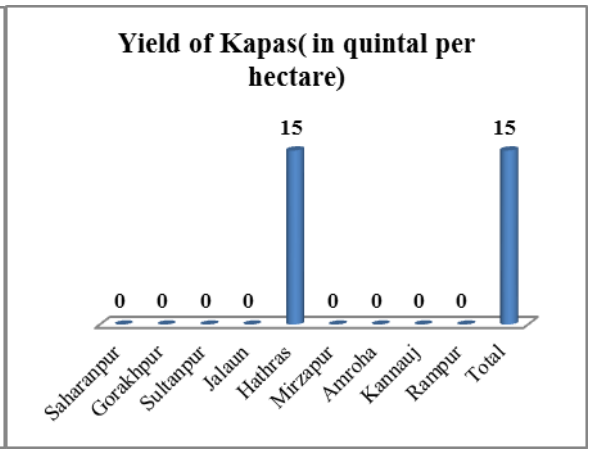
Figure 4.14: Area under Individual Other Crops on Sampled Farms (in percent):

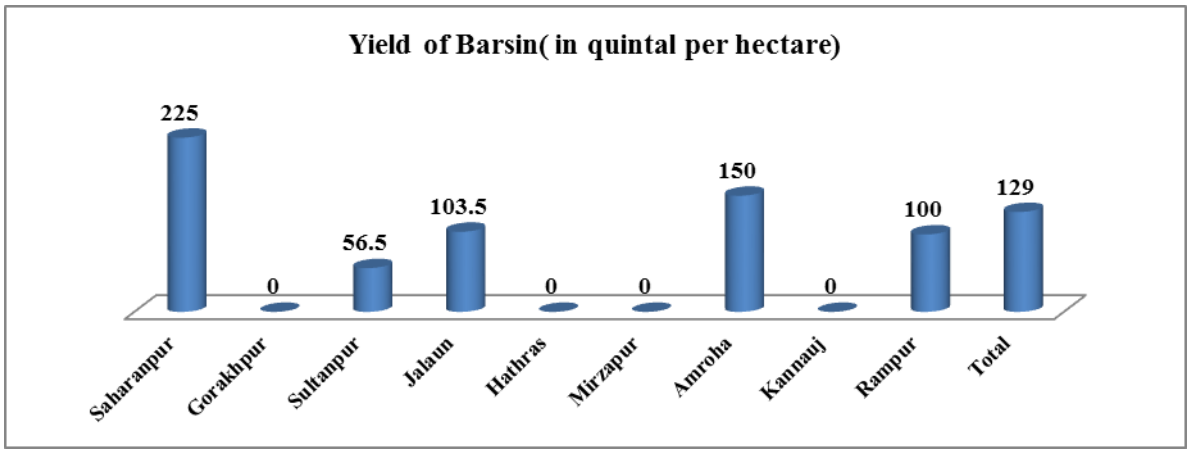


Source: Primary data

Figure 4.15: Yield of Individual Other Crops on Sampled Farms (in Qtl. Per Hect.)







II: Cost Structure:

This section presents economics of cost structure involved in horticulture crops in sampled farms from selected districts of our study. The primary survey incorporated 900 beneficiary farmers in Uttar Pradesh. The nine selected districts from nine agro-climatic zones formed the universe of our study. The cost incurred consists of two components, fixed cost and variable cost. The fixed cost of perennial crops consists of initial planting and gestation period cost. The variable cost is the running cost every year at the time of plant bearing fruit2. The major components of variable costs in grapes were topping and pruning, manure and fertilizer and harvesting and collection. Out of total cost,To study the cost structure the following items have been taken into account: total cost of seeds, cost on land preparation, cost of plantation, irrigation charges, cost on soil fertilizer, expenses on pesticides, value of hired human labour, cost on wash brand packaging, transportation cost, govt. revenue, cost on cold storage, cost of middlemen and others.

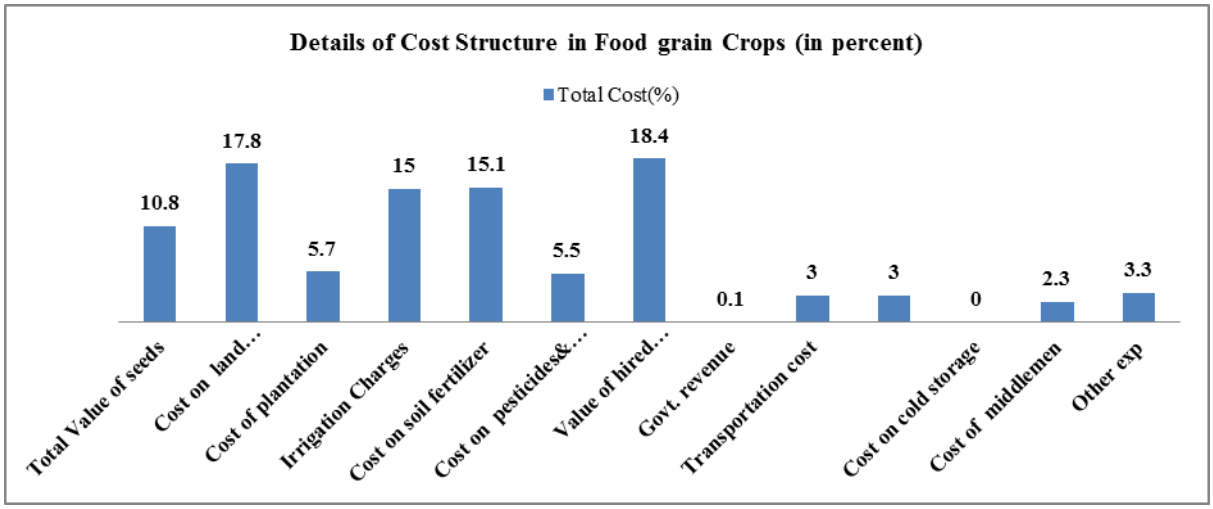
Table 4.10 highlights district wise details of cost structure involved in production of foodgrains crops. It shows that labour cost i.e. hired human labour accounts for 18.4 percent of total cost followed by the expenses on land preparation which was reported to be highest for foodgrain cultivation and account for 17.8 percent of the total cost. Expenses on soil fertilizers and irrigation charges were 15.0 percent of total cost. It was found that transportation and packaging cost was fairly enough at 3 percent of the total cost. The proportion of hired human labour cost was relatively higher for Saharanpur, Gorakhpur, Sultanpur and Jalaun districts than cost incurred on other items. The proportion of cost incurred on land prepration and fertilizers was higher than labour cost in Hathras and Mirzapur. In Amroha, the cost for Irrigation was highest due to unavailability of irrigation facility in the district. Similary the cost for land preparation was found to be highest than labour cost and other costs. Thus, it reveals that the in all districts the proportion of labour cost, expenditure on land preparation, and irrigation was relatively higher than the cost incurred on transportation, cost on plantation and other cost in cultivating foodgrains crops.

Table 4.10: District wise details of Cost Structure in Foodgrain Crops (Rs. per Hectare)

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Total Value of seeds	7.6	14.0	14.2	10.9	13.3	11.5	9.0	16.6	10.2	10.8
Cost on land prepration	17.4	18.8	17.2	15.3	23.3	17.0	18.8	17.6	17.9	17.8
Cost of plantation	7.6	6.4	6.1	0.8	2.5	5.6	6.1	4.7	8.4	5.7
Irrigation Charges	13.9	13.9	15.0	11.1	18.4	15.3	21.4	16.2	14.3	15.0
Cost on soil fertilizer	14.9	15.9	15.8	13.9	16.5	17.5	13.3	16.3	13.9	15.1
Cost on pesticides& insectides	5.3	5.1	5.5	3.8	4.3	6.1	6.0	5.8	7.3	5.5
Value of hired human labour	24.1	18.0	15.7	23.6	11.1	12.8	17.3	11.8	16.1	18.4
Govt. revenue	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1
A1: Cost of Cultivation	**91**	**92.2**	**89.6**	**79.5**	**89.5**	**85.9**	**91.9**	**89**	**88.2**	**88.4**
Transportation cost	3.0	2.8	3.9	2.6	3.0	2.3	2.0	2.4	4.4	3.0
Cost wash brand packaging	3.2	3.5	3.5	3.9	3.7	2.0	2.5	3.0	2.1	3.0
Cost on cold storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cost of middlemen	2.2	0.8	0.7	3.4	0.5	3.3	2.5	2.7	2.9	2.3
Other exp	0.6	0.7	2.2	10.7	3.4	6.5	1.0	2.9	2.3	3.3
A2: Cost of Marketing	**9**	**7.8**	**10.3**	**20.6**	**10.6**	**14.1**	**8**	**11**	**11.7**	**11.6**
Total Costs Per Hectare (000, Rs.)	100	100	100	100	100	100	100	100	100	100
	36.4	23.6	21.5	24.9	19.4	19.9	36.7	33.0	36.0	27.8

Source: Primary data
*exp on land includes value of owned and hired machinery + value of manure

Figure 4.16: Details of Cost Structure in Food Grains Crops (In percent) in Sampled Farms



Source: Primary Survey, 2019.

In the horticultural crops, labour requirement is higher compared to field crops as in the plantation crops labour is required for initial plantation, during the gestation period and during the period when plant is bearing fruit. The labour is required for initial land preparation, digging pits, lining, sowing

nursery, refilling top soil, planting nursery and other miscellaneous activities. During the gestation period labour uses include inter-culture operations, manure and fertilizers,' insecticides, weeding, irrigation, mulching, shading and other miscellaneous activities. The manpower requirement at the time of fruit bearing includes topping and pruning, manure and fertilizers, weeding, harvesting and collection, grading, storage and marketing. Table 4.11 explains the district wise detailed cost structure in cultivation of Fruit crops and shows that labour cost accounts for 31.8 percent of total cost in Sultanpur. The cost of labour is highest with 36.3 percent followed by cost of seeds i.e. 19.5 percent as compared to irrigation, fertilizers and transportation cost which is very low in Sultanpur District. For Fruit crops, packaging and branding is very important. Hence, it is important to analyze the cost spent on packaging where it was found that 13.8 percent of total cost was spent on brand pack of fruits, where the highest cost is spent by Gorakhpur district i.e. 25.1 percent of total cost spent on other items followed by labour cost. Gorakhpur was specialized in Mango cultivation which requires special packaging hence the brand pack cost was highest. It was found that the cost of irrigation and labour cost was highest in Hathras as the area specializes in Guava fruit cultivation which require better irrigation. Further, it is to be noticed that cost of middlemen was highest in Mirzapur and transportation cost was highest in Gorakhpur as it was specialized in growing of fruits like mango etc which require transporting of fruit after its cultivation.

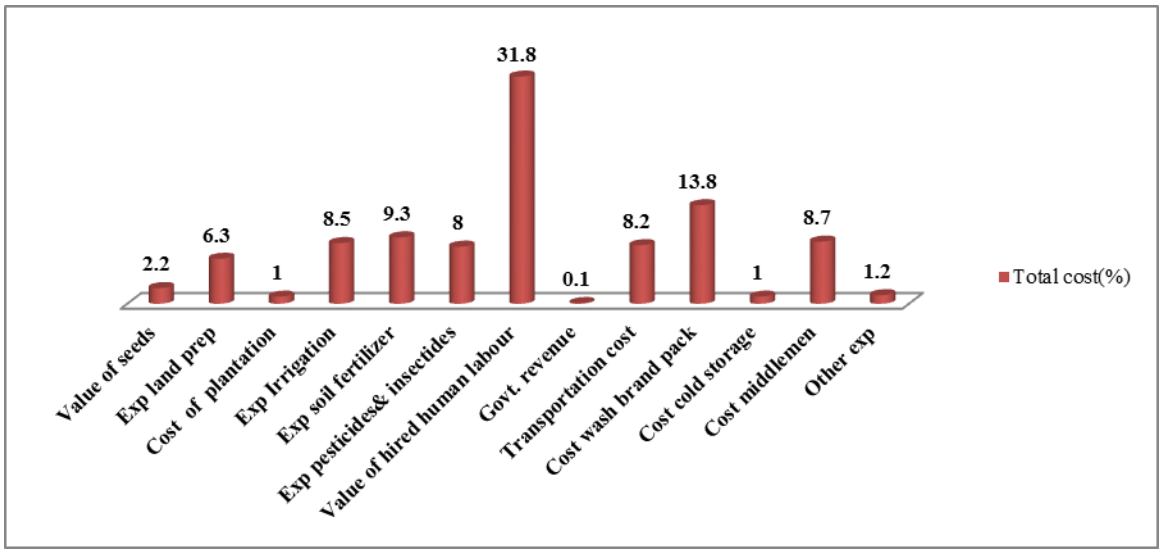
Table 4.11: District wise details of Cost Structure in Fruit Crops (Rs. per Hectare):

District	**Saharanpur**	**Gorakhpur**	**Sultanpur**	**Jalaun**	**Hathras**	**Mirzapur**	**Amroha**	**Kannauj**	**Rampur**	**Total**
Value of seeds	0.0	5.1	19.5	15.2	0.2	0.2	7.7	0.0	0.0	2.2
Exp land prep	6.6	6.8	5.0	10.6	2.5	6.0	14.3	0.0	0.0	6.3
Cost of plantation	0.4	1.2	4.1	8.2	0.4	0.0	6.4	0.0	0.0	1.0
Exp Irrigation	5.7	4.4	12.1	11.5	21.5	9.8	22.1	0.0	0.0	8.5
Exp soil fertilizer	9.1	4.8	8.3	12.9	14.0	7.6	10.7	0.0	0.0	9.3
Exp pesticides& insectides	7.7	8.9	4.1	10.4	11.9	5.6	9.2	0.0	0.0	8.0
Value of hired human labour	34.3	22.7	36.3	16.0	29.0	32.7	13.9	0.0	0.0	31.8
Govt. revenue	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
A1: Cost of Cultivation	**63.9**	**53.9**	**89.4**	**84.8**	**79.5**	**61.9**	**84.3**	**0**	**0**	**67.2**
Transportation cost	7.7	18.5	3.6	5.2	8.2	5.4	5.7	0.0	0.0	8.2
Cost wash brand pack	15.8	25.1	1.9	6.5	5.4	7.7	6.7	0.0	0.0	13.8
Cost cold storage	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Cost middlemen	9.8	2.0	4.8	3.6	6.0	21.9	1.6	0.0	0.0	8.7
Other exp	1.4	0.6	0.3	0.0	0.9	3.0	1.6	0.0	0.0	1.2
A2: Cost of Marketing	**36.2**	**46.2**	**10.6**	**15.3**	**20.5**	**38**	**15.6**	**0**	**0**	**32.9**
Total Costs	100	100	100	100	100	100	100	100	100	100
Per Hectare (000, Rs.)	76.95	101	151.95	61.8	64.95	35.15	7.7	0.00	0.00	61.57

Source: Primary Survey, 2019.

*exp on land includes value of owned and hired machinery + value of manure.

Figure 4.17: Details of Cost Structure in Fruit Cultivation (in percent)



Source: Primary Survey, 2019.

One of the objectives of promotion of Horticultunal is to create opportunities for employment generation for skilled and unskilled persons, especially unemployed youth in the villages in addition to enhancing horticultural production, improving nutritional security and providing income support to farm households. Table 4.12 reveals about the district wise details of cost structure involved in growing Vegetable crops. The table presents that the labour cost is highest for all districts for vegetable cultivation but after labour cost the highest cost is covered by total cost of seeds i.e. 10.6 percent followed by irrigation cost and cost on land preparation. Expenditure of 9.1 percent of the total cost was covered for brand packaging for vegetable crops. It is important to notice that cost of middlemen and transportation cost is relatively higher than other cost.

If district wise cost is examined, maximum cost of 22.5 percent account towards brand packaging followed by labour cost and fertilizers. A high amount of cost is also incurred on expenditure on land preparation. Major specialization in vegetable crop is in Saharanpur district which cultivated cauliflower due to which cost of brand packaging is higher than other costs. In Kannauj, the labor cost is highest followed by costs of seeds and irrigation costs. As tomato was the major specialized vegetable crop in Kannauj, which needs proper packaging and storage in cold storage, hence the cost of both inputs was also accounted by the farms. 2.0 percent of Cost on storage of total cost also account by Jalaun district as it specialized in other crops which needed to be stored after its cultivation, packaging and transportation. Hence, the table reveals that the labour cost is highest in all districts for vegetable crops followed by cost incurred by farms on seeds and farm preparation. The

proportion of cost by middlemen and packaging is also relatively high than other costs. Considerable differences in the cost structure for vegetable crops on different items are observed in the given table.

Table 4.12: District wise details of Cost Structure in Vegetable Crops (000, Rs. per Hectare)

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Value of seeds	4.7	12.4	8.1	10.1	16.4	7.7	11.2	11.6	13.0	10.6
Exp land prep	13.2	13.0	9.4	10.6	14.0	8.2	8.7	7.6	5.9	9.2
Cost of plantation	7.3	6.0	5.9	4.3	3.1	6.5	5.2	4.0	6.3	5.6
Exp Irrigation	9.8	12.6	10.7	11.8	15.0	12.2	10.0	10.5	5.7	9.9
Exp soil fertilizer	15.7	10.1	11.5	9.4	9.9	8.8	7.9	9.1	3.9	8.6
Exp pesticides	5.0	8.7	6.6	6.6	6.0	6.6	6.1	5.2	4.0	5.8
Value of hired human labour	18.7	18.1	19.4	24.4	17.8	24.5	24.2	28.8	33.5	25.1
Govt. revenue	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
A1: Cost of Cultivation	74.4	80.9	71.6	77.2	82.3	74.5	73.3	76.8	72.3	74.8
Transportation	1.3	5.1	10.3	4.9	9.5	6.1	7.0	6.8	4.3	5.7
Cost wash brand pack	22.5	6.8	9.4	7.1	3.1	9.0	8.6	5.2	8.9	9.1
Cost cold storage	0.0	0.0	0.0	2.0	0.0	0.0	0.0	1.3	0.0	0.5
Cost middlemen	0.5	6.7	7.9	7.5	3.8	9.8	9.6	7.8	14.2	8.9
Other exp	1.1	0.5	0.8	1.4	1.3	0.6	1.4	2.1	0.4	1.0
A2: Cost of Marketing	25.4	19.1	28.4	22.9	17.7	25.5	26.6	23.2	27.8	25.2
Total Costs Per Hectare (000, Rs.)	100	100	100	100	100	100	100	100	100	100
	70.27	56.37	62.25	41.57	53.1	65.45	115.1	81.72	95.55	65.95

Source: Primary Survey, 2019.

Table 4.13: District wise details of Cost Structure in Spice Crops (000, Rs. per Hectare):

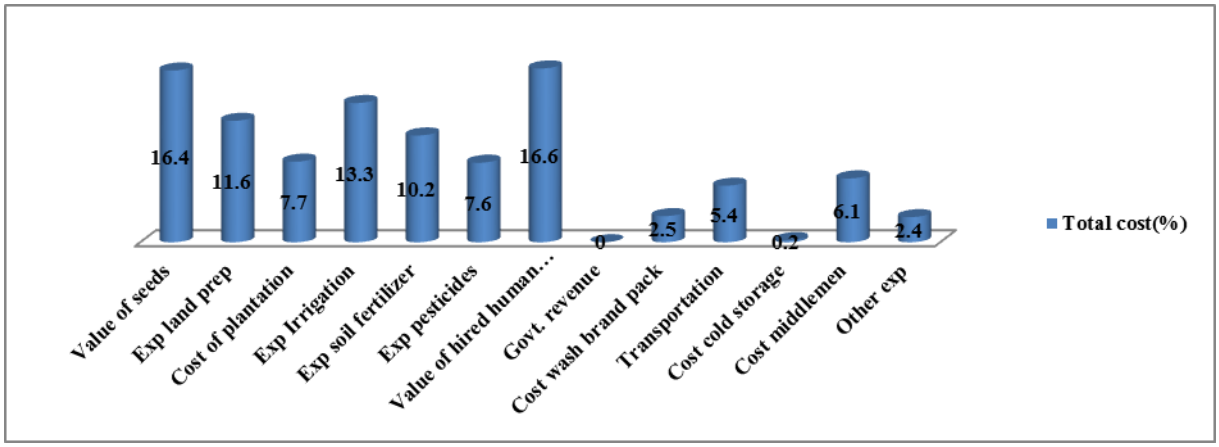
District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Value of seeds	20.8	16.1	24.1	13.4	5.4	15.3	6.4	14.8	17.5	16.4
Exp land prep	16.7	10.3	15.0	12.7	8.8	10.8	8.0	14.5	11.4	11.6
Cost of plantation	12.5	8.0	9.6	9.4	2.6	6.4	21.7	2.0	7.8	7.7
Exp Irrigation	6.3	11.9	17.0	14.2	22.0	15.4	12.6	16.1	12.2	13.3
Exp soil fertilizer	4.2	17.1	10.7	10.9	21.0	8.6	10.3	11.4	9.6	10.2
Exp pesticides	8.3	5.6	7.3	8.8	8.3	7.4	10.3	9.2	7.4	7.6
Value of hired human labour	0.0	17.2	3.5	13.8	17.9	14.6	14.8	16.6	17.8	16.6
Govt. revenue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A1: Cost of Cultivation	68.8	86.2	87.2	83.2	86	78.5	84.1	84.6	83.7	83.4

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Cost wash brand pack	4.2	4.0	2.4	3.1	0.3	4.3	5.1	0.4	2.4	2.5
Transportation	20.8	6.9	4.5	5.0	13.3	6.9	8.0	4.3	4.9	5.4
Cost cold storage	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.2
Cost middlemen	0.0	1.7	5.0	5.2	0.3	9.5	1.7	10.2	6.0	6.1
Other exp	6.3	1.1	1.0	1.4	0.1	0.8	1.1	0.6	2.9	2.4
A2: Cost of Marketing	31.3	13.7	12.9	16.7	14	21.5	15.9	15.5	16.2	16.6
Total Costs Per Hectare (000, Rs.)	100	100	100	100	100	100	100	100	100	100
	30	54.45	34.63	37.22	81.3	36.1	60.8	68.5	84.3	65.1

Source: Primary Survey, 20019.

Table 4.13 explains the district wise cost details involved in spice crops which reflects that after hired labour costs, maximum cost of 16 percent accounts by total cost of seeds followed by irrigation cost and cost on land preparation. 10.2 percent of cost accounts for fertilizers and pesticides. Cost of middlemen under spice crops is also incurred by all sample farms. It was found that maximum 20 percent of transportation cost is incurred by Saharanpur district and 16 percent on land preparation. The reason for high transportation cost may be due to growing of different spice crops where chilli was the major specialized spice crop in Saharanpur district. The table reveals that cost of seeds and irrigation cost was higher than other cost incurred under total spice crops cultivation.

Figure 4.18: Details of Cost Structure in Spices (in percent)



Source: Primary Survey, 2019.

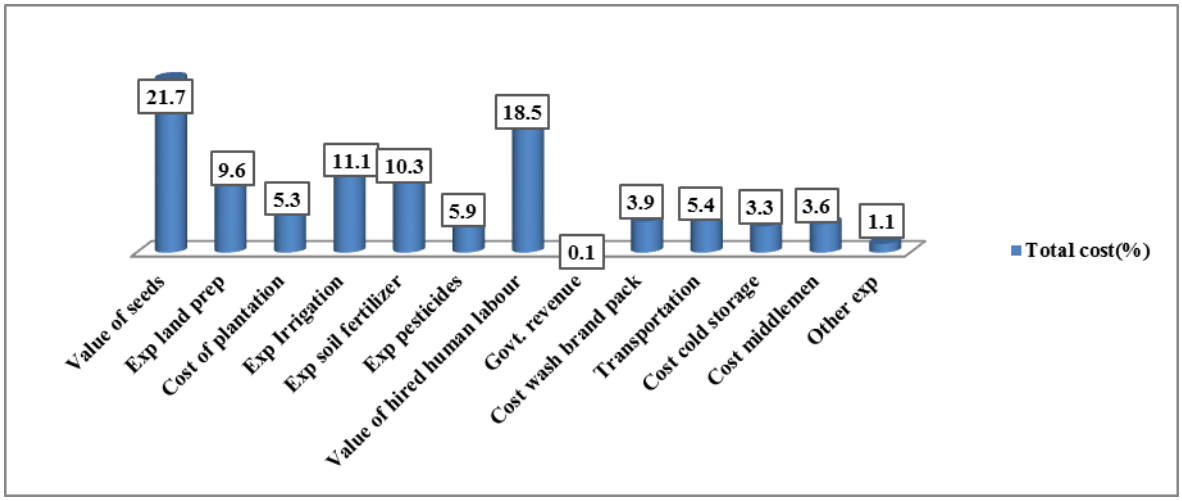
Table 4.14: District wise details of Cost Structure in Cash Crops (000, Rs. per Hectare)

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Value of seeds	18.1	21.2	18.7	14.8	33.7	15.1	19.2	23.2	18.2	21.7
Exp land prep	7.7	12.7	10.1	7.2	9.6	9.3	9.9	10.2	12.4	9.6
Cost of plantation	3.8	9.1	7.9	2.4	4.3	10.3	5.8	4.5	9.1	5.3
Exp Irrigation	16.1	9.1	10.3	9.0	8.9	9.6	13.9	10.7	8.0	11.1
Exp soil fertilizer	8.0	13.2	14.5	9.4	8.7	14.5	10.8	9.4	11.0	10.3
Exp pesticides	6.5	6.9	7.7	4.3	4.8	7.3	6.3	5.8	6.2	5.9
Value of hired human labour	24.3	15.2	15.6	31.7	6.0	12.3	22.6	16.3	10.1	18.5
Govt. revenue	0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1
A1: Cost of Cultivation	84.7	87.4	84.8	78.8	76.1	78.4	88.6	80.1	75.1	82.5
Cost wash brand pack	0.1	5.7	4.2	6.7	3.6	5.5	3.1	4.4	0.8	3.9
Transportation	11.0	3.8	3.9	3.4	3.9	7.5	5.7	4.0	14.6	5.4
Cost cold storage	0.0	0.5	1.6	0.7	12.5	2.8	0.7	4.3	0.5	3.3
Cost middlemen	0.0	1.6	4.0	9.6	2.8	5.4	1.0	5.5	5.6	3.6
Other exp	1.1	0.9	1.4	0.9	1.0	0.6	0.8	1.6	3.5	1.1
A2: Cost of Marketing	12.2	12.5	15.1	21.3	23.8	21.8	11.3	19.8	25	17.3
Total Costs Per Hectare (000, Rs.)	100	100	100	100	100	100	100	100	100	100
	81.35	41.25	69.5	49.92	52.92	68.75	83.72	67.6	75.05	61.85

Source: Primary Survey, 2019.

Table 4.14 reveals details of cost structure of cash crops which explains that 21.7 percent of total cost accounts for total cost of seeds followed by labour cost i.e. 18.5 percent. Near about 10 to 11 percent of total cost is also found to be incurred on irrigation and fertilizers. Cash crops include potato, onion, sugarcane and peanuts which need proper storage after its cultivation. Hence, 3.6 percent of the cost is also found to be incurred for its successful storage. 5.4 percent of the total cost accounts for its transportation facilities. Sugarcane was the major crop in Saharanpur where it was found that labour cost is much higher where 11 percent was found for transportation cost. Hathras, Mirzapur and Rampur specializes in Potato cultivation, hence it was found that the total cost of seeds was more than other expenses. Jalaun specializes in growing of Onion. The table reveals that under cash crops apart from labor cost, expenses on seeds and irrigation is higher as compared to other expenses.

Figure 4.19: Details of Cost Structure in Cash Crops (in percent)



Source: Primary Survey, 2019.

Table 4.15 explains district wise details of cost structure incurred on production of other crops. The table reveals that the labour cost is much less for other crops which include Chara, Kapas and Barsin. The production of other crops was highest in Saharanpur district i.e. 2.4 percent than other districts. Highest cost of 30.8 percent was incurred for irrigation expenses for other crops which included 37.7 percent contributed by Kannauj followed by Hathras (35.5 percent) and Mirzapur (33.8 percent). It was found that 27.7 percent of total cost was contributed by all sampled farms for land preparation followed by expenses on fertilizers (19.0 percent). Cost of middlemen and transport cost was very low as compared to cost on fertilizers and land preparation.

Table 4.15: District wise details of Cost Structure in Other Crops (000, Rs. per Hectare):

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Value of seeds	25.5	15.4	8.1	17.2	22.3	13.9	11.5	16.6	16.9	17.1
Exp land prep	11.8	34.6	42.3	28.2	18.4	32.4	35.3	29.7	30.2	27.7
Cost of plantation	4.5	0.0	0.0	3.8	0.0	0.0	2.1	0.0	3.4	2.4
Exp Irrigation	33.9	32.6	34.1	33.0	35.5	33.8	26.7	37.7	25.1	30.8
Exp soil fertilizer	21.3	17.5	15.5	14.2	15.8	18.7	24.4	16.0	15.8	19.0
Exp pesticides	0.3	0.0	0.0	3.1	3.3	1.1	0.0	0.0	1.5	0.9
Value of hired human labour	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	1.1
Govt. revenue	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
A1: Cost of Cultivation	99.8	100.1	100	100	95.3	99.9	100	100	96	99.1
Cost wash brand pack	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.1
Transportation	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.3
Cost cold storage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cost middlemen	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	1.0	0.3
Other exp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1
A2: Cost of Marketing	0.1	0	0	0	4.7	0	0	0	3.9	0.8
Total Costs Per Hectare (000, Rs.)	100 29.83	100 13.20	100 9.48	100 9.30	100 21.15	100 10.75	100 13.45	100 19.8	100 22.28	100 15.2

Source: Primary Survey, 2019.

Figure 4.20: Details of Cost Structure in Others Crops (in percent)

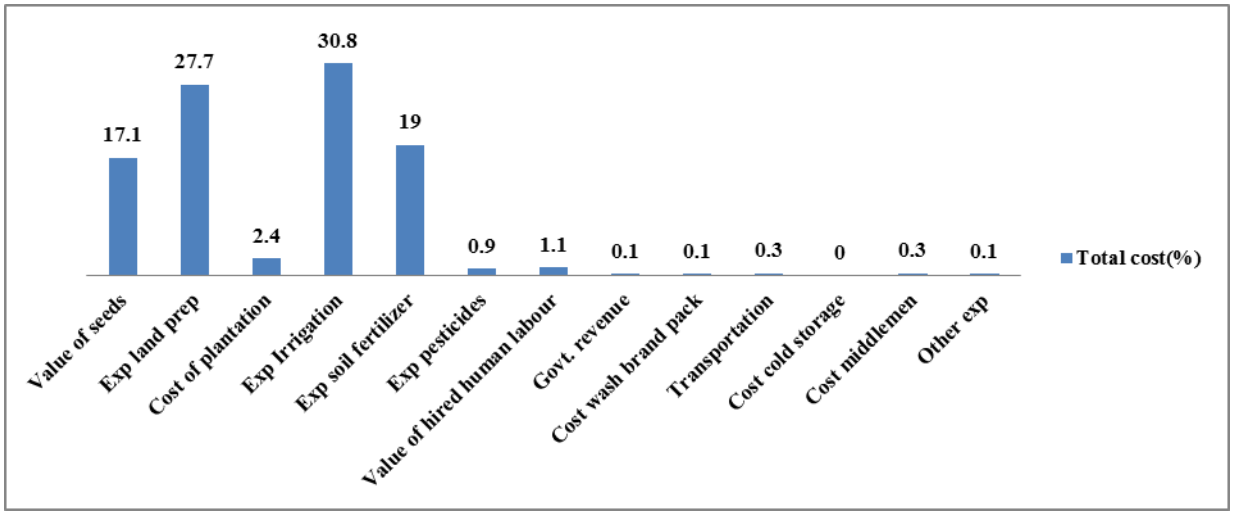


Table 4.16 states district wise details of cost structure on aggregate levels i.e. 23.7 percent of total cost accounted for hired labour cost in all sampled farms of selected districts. In this section, we discuss cost involved in labour absorption in various activities amongst our sampled selected horticultural growers namely, fruits, vegetables, spices and flowers. To our dismay we did not get any farmers who were involved in mushrooms production in these districts. This section presents cost incurred on labour absorption among the selected commodities of horticultural crops. It examines that hired labour cost is highest with 29.8 percent in Saharanpur district and it was lowest for Hathras. It reveals that hired labour cost for all districts was higher than other expenses. After hired labour cost, near about 11 percent of cost was incurred for preparation of land, irrigation and fertilizers, where it reveals that

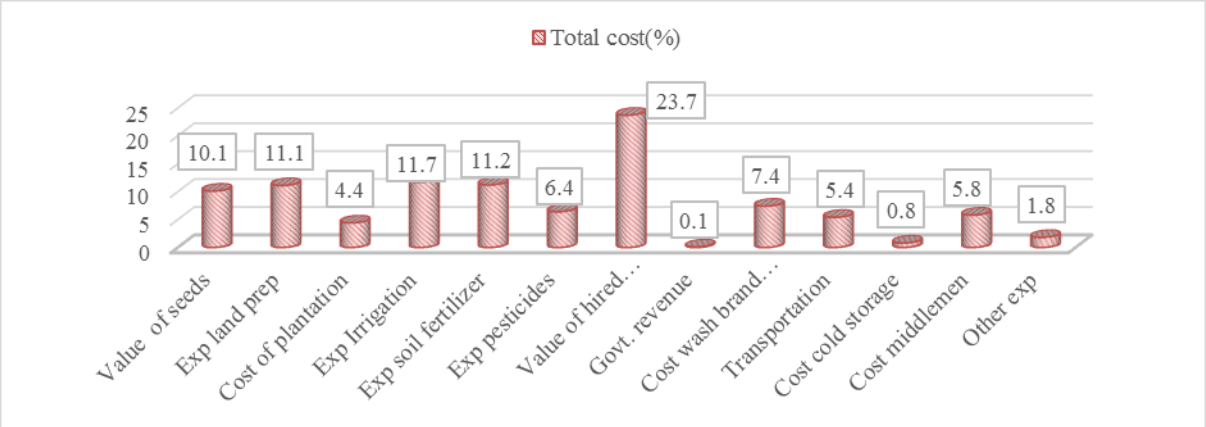
proportion of irrigation cost was relatively higher for Amroha, Hathras as compared to other sampled district. 10.1 percent of cost contributed towards the total cost for seeds where it highest for Kannauj and Hathras. 7.4 percent of total cost is also found to be incurred by farms on brand pack and transportation. It reveals that the overall cost related to middlemen, storage cost and other expenses were much lower than other costs. Hence, the efforts should be taken to overcome the labour cost in order to overcome the problems in growing of different horticulture crops.

Table 4.16: District wise details of Cost Structure in Aggregate Level (000, Rs. per Hectare)

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Value of seeds	3.4	12.0	13.7	12.4	15.2	8.0	12.9	15.5	12.8	10.1
Exp land prep	10.0	12.7	11.3	11.5	10.9	11.1	12.9	11.1	11.0	11.1
Cost of plantation	3.0	5.1	5.9	3.5	2.4	5.0	5.7	4.3	7.2	4.4
Exp Irrigation	8.8	9.8	12.5	11.2	16.3	13.6	15.6	14.3	10.2	11.7
Exp soil fertilizer	11.1	10.7	12.6	11.0	12.5	13.3	10.9	12.6	8.5	11.2
Exp pesticides	6.8	7.3	5.9	5.5	7.3	6.2	6.2	6.3	5.6	6.4
Value of hired human labour	29.8	19.0	20.9	24.1	16.6	22.0	20.8	20.7	24.3	23.7
Govt. revenue	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1
A1: Cost of Cultivation	73	76.6	82.8	79.2	81.3	79.3	85.1	84.8	79.7	78.7
Cost wash brand pack	12.1	11.5	5.3	5.8	4.1	5.0	4.7	3.5	5.4	7.4
Transportation	6.1	8.5	6.0	3.8	5.9	4.3	4.8	3.3	4.7	5.4
Cost cold storage	0.9	0.1	0.2	0.9	3.7	0.1	0.2	1.7	0.0	0.8
Cost middlemen	6.6	2.5	4.4	6.0	3.5	7.9	4.1	4.8	8.9	5.8
Other exp	1.1	0.6	1.3	4.1	1.5	3.4	1.1	2.0	1.5	1.8
A2: Cost of Marketing	26.8	23.2	17.2	20.6	18.7	20.7	14.9	15.3	20.5	21.2
Total Costs Per Hectare (000, Rs.)	100	100	100	100	100	100	100	100	100	100
	58.9	**41.9**	**40.7**	**35.9**	**39.9**	**31.45**	**48.35**	**57.75**	**51.2**	**45.47**

Source: Primary Survey, 2019.

Figure 4.21: Details of Cost Structure in Aggregate Level (in percent)



Further, the income, cost and profit per acre for major crops groups has been shown in table 4.17. In Saharanpur district, the profit percent per acre was highest for spices i.e. 80.0 percent and fruits (65.3) followed by food grains (59.3) and vegetables (49.1). The percent profit per acre was much lower for other crops (i.e. 7.8percent). Thus, in terms of profit percent per acre, cultivation of spices, fruits and vegetables was much profitable as compared to other crops and flowers in Saharanpur District.

Such derivations from the field data reflects on the scope for high potential of crop diversification and thereafter income enhancement. Diversification towards horticulture (fruit and vegetables plus condiments and spices) was seen from area share, growth in production and production shares. Further, in Gorakhpur district, percent profit per acre was 68.5 percent out of total income per acre of 44.5 percent, where the proportion of vegetables and other crops was higher as compared to other cash crops. Hence, it was more profitable to grow vegetable crops and other crops as compared to cash crops. Similarly, in Sultanpur district, the proportion of profit percent per acre was higher for fruits and vegetables than foodgrain cultivation. 71.0 percent of profit percent was found from 26 percent of cost incurred from other horticulture crop groups thus revealing that it is more profitable to grow fruits and vegetables than other group of crops in Hathras district.

The proportion of percent profit per acre was highest for flowers in Kannauj. Therefore, it can be said that it was more profitable to grow flowers as compared to other crops. Rampur and Kannauj district do not have cultivation of fruits. the highest profit in Rampur district is seen in vegetables crops. Hence, it is more profitable to grow vegetables as compared to other

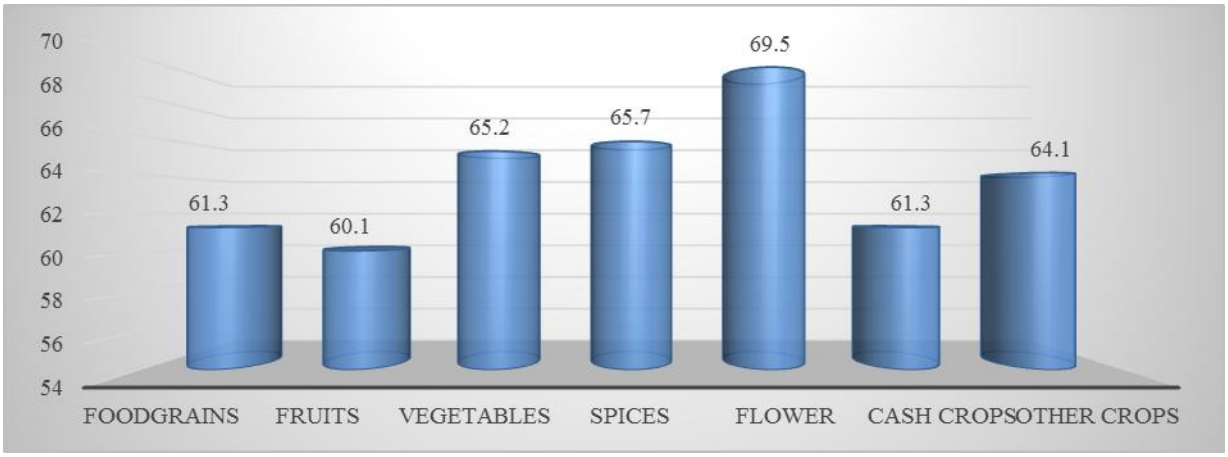
groups of crops. The table reveals about the high potential of crop diversification in all sample farms.

Table 4.17: District wise Income, cost and percent Profit on various horticulture crops:

	District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Foodgrains	Income/ Acre	35.8	26.0	22.4	26.8	20.8	21.7	36.3	35.9	36.2	28.7
	Cost/Acre	14.6	9.4	8.6	10.0	7.8	8.0	14.7	13.2	14.4	11.1
	Profit /Acre	21.2	16.5	13.8	16.8	13.0	13.7	21.6	22.7	21.8	17.6
	percent Profit / Acer	(59.3)	(63.6)	(61.6)	(62.8)	(62.6)	(63.3)	(59.5)	(63.2)	(60.2)	(61.3)
Fruits	Income/ Acer	88.7	58.9	181.0	84.7	89.7	51.0	6.4	0.0	0.0	61.7
	Cost/Acer	30.8	21.3	60.8	24.7	26.0	14.1	3.1	0.0	0.0	24.6
	Profit /Acer	57.9	37.6	120.2	59.9	63.7	37.0	3.3	0.0	0.0	37.1
	percent Profit / Acer	(65.3)	(63.9)	(66.4)	(70.8)	(71.0)	(72.4)	(51.5)			(60.1)
Vegetables	Income/ Acer	55.2	66.8	75.5	50.8	65.7	85.6	130.3	81.2	115.6	75.9
	Cost/Acer	28.1	22.6	24.9	16.6	21.2	26.2	46.0	32.7	38.2	26.4
	Profit /Acer	27.1	44.3	50.6	34.2	44.5	59.4	84.2	48.5	77.4	49.5
	percent Profit / Acer	(49.1)	(66.3)	(67.0)	(67.3)	(67.7)	(69.4)	(64.7)	(59.7)	(66.9)	(65.2)
Spices	Income/ Acer	60.0	0.0	0.0	41.2	96.5	41.3	72.2	82.5	96.2	76.0
	Cost/Acer	12.0	0.0	0.0	14.9	32.5	14.4	24.3	27.4	33.7	26.0
	Profit /Acer	48.0	0.0	0.0	26.3	64.0	26.9	47.9	55.1	62.5	49.9
	percent Profit / Acer	(80.0)			(63.8)	(66.3)	(65.1)	(66.3)	(66.8)	(64.9)	(65.7)
Flower	Income/ Acer	0.0	0.0	0.0	82.4	0.0	128.9	0.0	128.8	0.0	112.9
	Cost/Acer	0.0	0.0	0.0	25.5	0.0	43.6	0.0	36.2	0.0	34.4
	Profit /Acer	0.0	0.0	0.0	56.9	0.0	85.3	0.0	92.6	0.0	78.5
	percent Profit / Acer				(69.1)		(66.1)		(71.9)		(69.5)
Cash Crops	Income/ Acer	77.3	43.4	80.7	64.3	52.9	110.2	82.9	68.6	72.2	64.0
	Cost/Acer	32.4	16.5	27.8	20.0	21.2	27.5	33.5	27.0	30.0	24.7
	Profit /Acer	44.9	26.9	52.9	44.3	31.7	82.7	49.4	41.6	42.2	39.2
	percent Profit / Acer	(58.0)	(62.0)	(65.6)	(68.9)	(60.0)	(75.0)	(59.6)	(60.6)	(58.4)	(61.3)
Other Crops	Income/ Acer	12.9	15.0	11.1	10.4	22.7	16.8	20.2	23.3	25.1	17.0
	Cost/Acer	11.9	5.3	3.8	3.7	8.5	4.3	5.4	8.0	8.9	6.1
	Profit /Acer	1.0	9.7	7.3	6.7	14.2	12.5	14.8	15.3	16.2	10.9
	percent Profit / Acer	(7.8)	(64.9)	(66.0)	(64.2)	(62.7)	(74.4)	(73.3)	(65.8)	(64.6)	(64.1)
Total	Income/ Acer	48.0	44.5	46.5	42.9	46.6	38.7	50.2	65.2	57.7	46.6
	Cost/Acer	23.6	14.0	16.3	14.4	16.0	12.6	19.3	23.1	20.5	18.2
	Profit /Acer	24.4	30.5	30.2	28.5	30.7	26.1	30.8	42.1	37.3	28.4
	percent Profit / Acer	(50.9)	(68.5)	(65.0)	(66.5)	(65.7)	(67.5)	(61.5)	(64.6)	(64.5)	(61.0)

Note: Income, Costs and Profit (000, Rs. per Acer)

Figure 4.22: Net Income per Acre of Different Horticulture Crops in Sample Farms



Source: Primary data

III. Estimates of Productivity/ Yield Based on Field Survey and Secondary Data and Difference in Yield of Horticultural Crops:

As also mentioned in the chapter 2, despite the horticulture sector's impressive growth in recent years, there has been substantial discrepancies emerging in terms of data-base (area, production and yield) of horticultural crops, and inclusion of individual crops in the broader category of horticulture crops in the country. This poses a serious problem in understanding the real development and contribution of horticulture sector in the national economy. Besides, there is no systematic data- base for the marginal and minor horticultural crops. The present section is an attempt to cross-check the variation of the yields of horticulture crops estimated by the Government agencies and the primary field survey conducted by this study. Also, in terms of the inclusion of individual crops under the broader horticulture crops (e.g. fruit, vegetable, spices, flowers etc.), it was found that a huge variation could be perceived in the yield of different crops from the survey data and the data provided by horticulture department/website.

To circumvent and control this variation, we usually use the average of three years in agriculture sector i.e. 'triennium ending averages'. In our study it was not a longitudinal survey but to capture the scenario we did survey of nine districts from nine agro-climatic zones of Uttar Pradesh. Hence, we have data for field survey only at a point of time i.e. for 2018-19, the year when the survey was conducted and hence forth the variation reported through our empirical finding is understood to be very byouyant. However we have given an estimate of production to see the situation of horticulture production as well and also have tried to assess the difference in the yield of various horticultural crops grown by the

respondents based on our survey results and secondary data obtained from the Department of Horticulture, Government of Uttar Pradesh, Lucknow.

Besides, during the survey, we have identified some crops on which separate data on area, production and yield are not collected by the Department of Horticulture, Uttar Pradesh and some of the crops which are in DES data - could not be captured through our survey due to random selection of growers and that too from high producing blocks/ villages from selected districts/ agro-climatic zones in Uttar Pradesh.

From tables below we can see the difference of yield level of different crops between the survey and government data of the individual horticulture crops in Uttar Pradesh. Yield data reported here in this section was collected by the Department of Horticulture, Government of Uttar Pradesh (DoH, hereafter in this section) in 2017-18 and a comparison, if not exact, was made with the sample survey conducted by this present study in 2018-19. Under the fruit crops, anola; banana, guava, litchi, muskmelon, papaya, water- melon are the common fruits in both; the survey agency as well as the field survey. But, yield level of all the fruits crop included in this section were found to have been over-estimated by the agency. Some fruits which we have found during the survey as pomegranate, peach, raspberry and lemon was not in the secondary data while jackfruits and some other citrus fruits which are given by the secondary data, we couldn't capture in the field survey.

Table 4.18: Difference in Yield of Fruits through Field Survey and Estimates of Secondary data for Horticultural Crops (Qtls./ha)

Name of Crops	Survey Yield 2018-19	Yield based on Secondary 2017-18	Difference*
Anola	85.0	110	-25.0
Banana	344.5	452.5	-108.0
Guava	78.8	185	-106.3
Litchi	28.8	85	-56.3
Mango#	75.8	182.5	-106.8
Musk melon	89.3	260	-170.8
Papaya	417.5	507.5	-90.0
Water melon *(1 sample*)	40.0	450	-410.0
Lemon (Mirzapur-18)	79.3		
Peach (in Amroha-1)	62.5		
Pomegranate (Jalaun-3)	55.8		
Raspberry (Hathras-1)	50.0		
Jackfruit		252.5	
Other Citrus		37.5	
Other Fruits	76.0	157.5	-81.5
Total	114.1	242.5	-128.4

Source: primary survey 2018-19 and Department of Horticulture. *Difference is estimated by subtracting Agency data from the Primary survey Data collected by the Department of

Horticulture, Govt. of Uttar Pradesh. *#, Most of mango growing households have new orchards of mango (age of mango orchards was only 3-5 years). So the yield of mango was very low.*

In the case of vegetables, 28 individual crops have been included for comparison (Table 4.19). Out of 28, three vegetables i.e. turnip, pointed guard and sweet potato was in the agency data but could not be captured during field survey. Besides, 5 vegetables namely spinach, capsicum, cucumber, gwar and soya which were not in the secondary data were found in our field data.

One more crop i.e. mushroom, which is neither found in the secondary data nor did we find during our field survey, though when we initiated the study, we proposed to cover this crop as well. We would have loved to know the status of mushroom in the state but in our sample, we did not find any single household who is growing it. Two farmers in Saharanpur district reported that they were growing mushrooms but as a kitchen gardening and only for self-consumption.

Hence in the vegetables crops we can compare the yield of only 18 crops. The yield level of **Arbi/ Colacasia**, **green chili, Cauliflower** and onion estimated by the agency was found lower to the estimates generated by field survey. While, yield level of remaining 14 crops were found to have been over-estimated by the agency. It means yield level found in the survey data was lower to the secondary data.

Table 4.19: Difference in Yield of Vegetables through Field Survey and Estimates of Secondary data for Horticultural Crops (Qtls./ha)

Name of Crops	Survey Yield 2018-19	Yield based on Secondary 2017-18	Difference*
Arbi/ Colacasia	168.3	167.5	**0.75**
Ash Gourd/Petha	141.8	360.0	-218.25
Beans	35.0	147.5	-112.50
Bitter Gourd	85.8	187.5	-101.75
Bottle Gourd	283.8	305.0	-21.25
Brinjal	226.0	342.5	-116.50
Cabbage	305.8	335.0	-29.25
Carrot	132.8	252.5	-119.75
Cauliflower	233.3	227.5	**5.75**
Green Chili	77.8	25.0	**52.75**
Green peas	73.3	127.5	-54.25
Okra /Ladies Finger	110.0	135.0	-25.00
Onion	159.0	157.5	**1.50**
Potato	221.3	252.5	-31.25
Pumpkin	220.0	387.5	-167.50

Name of Crops	Survey Yield 2018-19	Yield based on Secondary 2017-18	Difference*
Radish	81.0	265.0	-184.00
Ridge/Sponge Gourd	180.5	232.5	-52.00
Tomato	210.5	440.0	-229.50
Capsicum	108.8		
Cucumber	274.8		
Gwar	25.0		
Soya	75.8		
Spinach	85.0		
Pointed Gourd /Parwal		272.5	
Sweet Potato		132.5	
Turnip		325.0	
Mashroom	-	-	
Other Vegetables	95.5	250.0	-154.50
Total	186.8	217.5	-30.75

Source: primary survey 2018-19 and Department of Horticulture. *Difference is estimated by subtracting Agency data from the Primary survey Data collected by the Department of Horticulture, Govt. of Uttar Pradesh.

Under the spicies, 7 crops have been included for comparison (Table 4.20). Out of 7, two crops i.e. fenugreek and ginger were in the agency data but not found during field survey. In case of species, estimated yield of all five crops were under-estimated by the agency. Yield of field data was much higher than the agency data. This is because, the perishability of species is not much when compared to the fruits and vegetables and the probability of insects causing damage was also lower. Species have much potential to increase the export as well as to increase the farmers income as compared to the others horticulture crops.

Table 4.20: Difference in Yield of Spices through Field Survey and Estimates of Secondary data for Horticultural Crops (Qtls./ha)

Name of Crops	Survey Yield 2018-19	Yield based on Secondary 2017-18	Difference*
Coriander Seed	47.5	5.5	42.00
Fennel (Sauf)	16.8	9.3	7.50
Garlic	65.8	58.5	7.25
Red Chilly	77.8	8.0	69.75
Turmeric	107.3	30.3	77.00
Fenugreek		6.0	-6.00
Ginger		52.0	-52.00
Total	75.0	27.5	47.50

Source: primary survey 2018-19 and Department of Horticulture. *Difference is estimated by subtracting Agency data from the Primary survey Data collected by the Department of Horticulture, Govt. of Uttar Pradesh.

Table 4.21: Difference in Yield of Flowers through Field Survey and Estimates of Secondary data for Horticultural Crops (Qtls./ha)

Name of Crops	Survey Yield 2018-19	Yield based on Secondary 2017-18	Difference*
Gladiolus	103.3	125.0	-21.75
Marigold	122.5	20.0	102.50
Rose	125.3	30.3	95.00
Guldaudi	281.3		
Jasmine	63.3		
Mehendi	52.5		
Rajnigandha	122.0		
Tagarh	292.5		
Udahul	372.0		
Total	122.8	46.0	76.75

Source: primary survey 2018-19 and Department of Horticulture. *Difference is estimated by subtracting Agency data from the Primary survey Data collected by the Department of Horticulture, Govt. of Uttar Pradesh.

Table 4.21 is showing the difference of yield level of flower crops between the survey and government data of the individual horticulture crops in Uttar Pradesh. As of the flower crops, secondary data shows only three flowers but during our filed visit we got the data relating to 9 flowers (table 4.21). Districts growing different flowers are different. The yield of marigold and rose obtained through survey was much higher than estimates made by the secondary data, but the yield of gladiolus was overestimated by the agency.

Further, the areas under vegetables, mushroom, fruit and medicinal plants grown in backyard/ kitchen garden of the households were not collected in the field survey. Moreover, number of new short duration crop varieties were grown by the sample farmers is noted during our survey period. Even some of short duration crops like vegetables, flowers, some of medicinal plants etc. are covered during the survey, they are not listed separately in the final crop abstract but clubbed together under “other crops” because area and production of these crops were very nominal. Thus, there is an urgent need to review the entire process of data collection and work out standardized methodologies to cover all the crops grown through the State and in all the seasons.

IV. Estimation of Production of Different Horticulture crops based on Primary Data

In this section we have tried to estimate the production of different horticulture crops. However, the area of the different crops cannot be included in this section due to the difference of the population/universe of the survey between the public agencies and the

present study. For instance, public agencies (DES, DHO, etc) surveyed entire State and country, while, this present study covered a few sample villages from 9 agro-climatic zones of the State of Uttar Pradesh for the study.

So, we tried to estimate the production of the different horticulture crops at agro-climatic zone-wise as well as at state level. For estimation, we have taken the final area of different horticulture crops given by the DoH (Department of Horticulture) and productivity estimated through the primary survey. But this estimation based on empirical investigation might project lower estimates at the state level because of much byouncy/ fluctuation in the productivity of different crops on the annual basis due to natural or other calamities**.** To control this variation, we computed the average for three years i.e. triennium ending averages. Here we have only one year's data so variation will be so high. However, we have given an estimate of production to see the situation of horticulture production at district as well as state level. To estimate the zone –wise production, we have taken the sum of area of different district belonging to the respective zone and for yield, we assumed the average yield of surveyed district as same for the zone. Further, to estimate the state level production, we added the zone-wise production and thus projected for the state level.

Table 4.22 shows the estimated production of different fruits for the agro-climatic zone-wise as well as state level. Among the fruits, banana production is highest followed by mango. But here, there is a need to clear one thing that, during the survey year, in Rampur we did not found any production of mango because some of growers reported that in their orchards, mango production being alternative years. Last year mango production was good but in the current year he production of mango was very law. On the other hand, in and Amroha, and Saharanpur, some of surveyed household have new mango orchards, so yield of mango was very law. Age of the tree affect the mango production. So, banana production is higher than the mango at state level. The production of litchi, we only found in Saharanpur and muskmelon & papaya only in Sultanpur. The growers of zone three, growing many kind of fruits as compared to others zones.

Table 4.22: Zone-wise Estimates Production of Fruit Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	UP
Surveyed district	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Anola	0.0	0.0	0.0	251.0	0.0	0.0	0.0	0.0	0.0	2952.7
Banana	0.0	19.8	4937.1	1009.4	0.0	0.0	0.0	0.0	0.0	23612.6
Guava	61.2	0.0	2353.3	28.3	907.7	92.7	814.7	0.0	0.0	3859.3
Litchi	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	120.2
Mango	*1157.3*	*8.8*	*8675.3*	*3455.0*	*0.0*	*0.0*	*1043.6*	*0.0*	*0.0*	*19901.4*
Musk melon	0.0	0.0	636.5	0.0	0.0	0.0	0.0	0.0	0.0	1861.1
Papaya	0.0	0.0	316.1	0.0	0.0	0.0	0.0	0.0	0.0	831.0
Water- melon	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	543.2
Others	14.6	12.1	807.3	66.0	47.7	36.4	113.2	0.0	0.0	840.5
Total	807.5	514.5	25693.7	7273.2	3399.2	4411.4	140.8	0.0	0.0	26265.2

Source: Estimated by the author.

Table 4.23 shows the estimated production of different vegetables at the agro-climatic zone-wise as well as state level. Under the major vegetables, production of potato is highest followed by green peas, onion, tomato and bottle guard. But here, there is a need to clear one thing that, growers reported that they faces maximum losses in the vegetables due to different kind of diseases and insects. Besides, prices of vegetables also fluctuate whole years. The production of beans, bitter guard, sitafal was very law. Very few farmer grow these crops because of lack of demand.

Table 4.23: Zone-wise Estimates Production of Vegetable Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	UP
Arbi (taro root)	0.0	30.5	347.2	0.0	0.0	0.0	488.1	0.0	30.5	1665.5
Beans	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	343.0
Bitter gourd (karela)	0.0	28.8	0.0	0.0	5.1	53.8	0.0	0.0	15.3	359.2
Bottle Gourd (lauki)	153.4	48.8	610.8	247.6	439.3	107.3	1569.1	0.0	1301.6	4069.6
Brinjal	0.0	46.5	265.2	218.6	52.4	117.0	403.8	13.1	75.4	1788.2
Cabbage (band gobhi)	0.0	41.9	757.3	0.0	0.0	0.0	2568.8	0.0	0.0	2735.7
Carrot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	270.6	840.6
Cauliflower (phul gobhi)	133.0	33.0	691.5	0.0	528.3	505.0	370.1	9.6	826.3	4038.9
Green Chilly	114.1	57.4	2171.7	134.7	102.8	34.7	366.9	95.5	118.8	2265.2
Green peas	0.0	15690.8	0.0	1957.6	0.0	779.4	1588.0	0.0	158.8	15990.0

Name of Crops	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	UP
Lady finger	72.1	52.8	623.3	0.0	104.3	391.0	0.0	0.0	320.1	2490.6
Onion	0.0	136.7	89.4	927.3	0.0	0.0	327.3	642.3	0.0	4216.9
Potato	561.2	494.2	40302.7	20705.0	9738.8	5975.9	64868.7	1116.8	4464.7	134323.7
Pumpkin	0.0	0.0	729.1	0.0	0.0	0.0	0.0	0.0	104.9	2095.6
Raddish	0.0	0.0	98.3	0.0	0.0	0.0	0.0	0.0	50.1	467.4
Ridge gourd (turai)	0.0	41.2	747.2	198.5	50.1	108.7	805.4	0.0	212.9	2380.3
Sitafal	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0	0.0	213.4
Tomato	0.0	218.5	985.2	552.3	39.9	317.3	2075.9	168.8	375.2	4416.1
Others	0.0	1391.9	5419.7	1486.4	710.5	638.6	2651.7	1286.0	5496.8	17772.2
Total	5856.0	23972.7	61794.7	15960.9	18762.8	13382.4	85346.5	4432.4	19955.7	231794.9

Source: Estimated by the author.

Table 4.24 shows the estimated production of different species at the agro-climatic zone-wise and at state level. The production of species in Uttar Pradesh is very law. This is not because of yield, but due to less area under species cultivation. People only grow 5 to 6 crops of species. Among them garlic production is highest followed by chillies, But here, there is a urgent requirement to encourage the growers to cultivate the different kind of species. Government has to mke them understand the profitably of species. The production of coriander, saunf and turmaric was very law. Very few farmer grow these crops because they are unaware about the potentiality of species.

Table 4.24: Zone-wise Estimates Production of Spice Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt.

Name of Crops	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	UP
Corriander	0.0	0.0	130.8	0.0	0.0	0.0	0.0	1.4	0.0	337.5
Saunf	0.0	0.0	5.7	0.0	0.0	0.0	0.0	0.0	0.0	12.7
Garlic	0.0	1.7	929.1	0.0	0.0	0.0	0.0	0.9	21.8	2497.7
Chillies	114.1	57.4	2171.7	113.5	102.8	34.7	366.9	95.5	118.8	2236.2
Turmeric	0.0	0.0	37.2	0.0	0.0	0.0	0.0	0.0	0.0	204.2
Total	140.2	149.7	2232.9	225.0	279.6	115.0	1970.6	88.8	161.7	5782.0

Source: Estimated by the author.

As per the species, the cultivation of flowers is also very law in the state. During the field survey, we found ony three districts where farmers growing flowers. The main reason behinf the less area under flower cultivation the perishable nature of the flowers. Besides, there is not much more proper marking and mandi for the flowers. Only kanauj district has highest area and production under different kind of flowers because in the district, there are processing industries of the flowers.

Table 4.25: Zone-wise Estimates Production of Flower Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	UP
Gladiolus	0.0	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	354.2
Marigold	0.0	0.0	0.0	38.0	0.0	24.8	0.0	0.0	0.0	488.2
Rose	0.0	0.0	0.0	10.8	0.0	39.5	0.0	1.0	0.0	1695.6
Total	0.0	0.0	0.0	74.8	0.0	87.0	0.0	0.9	0.0	2575.0

Source: Estimated by the author.

Besides, Jalaun and Mirzapur also growing the flowers. Among the flowers, the production of Rose is highest followed by the marigold and gladious. In the field survey, we also found the other flowers also growing the farmers. Since, we do not have the secondary data of these crops, we could not estimate the production of those flowers.

The district-wise details of estimated production have been given in the appendix tables.

V: CONCLUSION:

Our study has clearly demonstrated that the benchmark survey of all the horticulture crops in the sampled farms was very pertinently carried out by determining the area, production and yield on basis of primary survey. The study conducted district wise detailed analysis of cost incurred on various horticulture groups of crops and also explains about the percent profit per acre of all horticulture crops enjoyed by the farming community of our sampled farms. It can be concluded that out of total gross cropped area, the food grain cultivation constituted maximum area under cultivation and different horticulture crop followed by fruits, vegetables and cash crops. It was found that area under spices and flower cultivation are in very low proportion in the selected districts. It also reflects upon the fact that overall, the yield per acre was highest for cash crops. Potato cultivation had an upper hand in terms of districts specializing in its growing in almost maximum district. Overall Yield was also highest for other crops followed by total vegetables, spices and fruits. Mango was the most important fruit crops of the state accounting for maximum proportion of the area. Other main fruits were banana, guava, papaya muskmelom, sitafal etc. A wide variety of vegetables are also grown all over the state including potato, tomato, and cauliflower, etc. Overall, the findings are that the total yield under vegetable crops was much better in Rampur and Amroha districts. Further, it can be concluded that chilli and garlic was the major spice crops in selected sampled district as compared to coriander, turmeric and sauf. Rose, marigold and jasmine were the major flower crops grown in the selected sampled farms. However, an effort

should be made to raise the yield of popular flowers in the districts by making all efforts. There has been a sharp increase in the area and output of horticulture crops in selected sample district thereby giving scope for further diversification and increasing income in the future. Further, our study reveals about the there is high potential of crop diversification for income enhancement of farmers. The study also elaborates and explains about the cost structure thorugh examining total cost spent on seeds, expenditure on land preparation, cost of plantation, expenditure on irrigation, expenditure on soil fertilizer, expenditure on pesticides, labor cost, cost incurred on washing branding and packaging, sowing to transplanting, transportation cost, Govt. revenue, cost on cold storage, cost on middlemen and other cost. It can be perceived that the proportion of labor cost for all crops was highest followed by other costs such as cost of seeds, irrigation and land preparation. The percent profit per acre was 28.4 percent from 46.6 percent per acre income. Hence, it can be concluded that if farmers shift their area to horticulture crops, income can be increased, and it can be more profitable to the farmers to grow more crops in the district. As, it has been well recognized that the horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas.

Appendices

Table A1: Details of Zone and the Surveyed Districtsi in the Respected Zone.

agro-climatic zone	Zone-1 Bhabhar and Tarai Zone	Zone-2 Bundelkhand Zone	Zone-3 Central Zone	Zone-4 Eastern Plain Zone	Zone-5 Mid-Western Plain Zone	Zone-6 North-Eastern Plain Zone	Zone-7 South-West Semi Arid Zone	Zone-8 Vindhya Area	Zone-9 Western Plain Zone	**Uttar Pradesh**
surveyed districts	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total

Table A2: District wise Estimates Production of Fruit Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	**Saharanpur**	**Gorakhpur**	**Sultanpur**	**Jalaun**	**Hathras**	**Mirzapur**	**Amroha**	**Kannauj**	**Rampur**	**Total**
Aonla/Gooseberry	0.0	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	196.4
Banana	0.0	11655.6	98.1	0.0	0.0	0.0	0.0	0.0	0.0	6583.4
Guava	21.8	0.0	10.7	0.2	352.9	42.4	28.9	0.0	0.0	600.1
Litchi	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8
Mango	2861.2	373.0	990.6	1.3	0.0	0.0	707.5	0.0	0.0	4331.2
Muskmelon	0.0	0.0	6.0	0.0	0.0	0.0	0.0	0.0	0.0	233.8
Papaya	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	59.3
Watermelon	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	65.4
Other Fruits	12.1	1.5	20.8	1.3	6.0	6.8	11.4	0.0	0.0	113.1
Total	1355.4	3530.5	1817.1	35.2	729.5	81.5	29.4	0.0	0.0	5175.0

Table A3: District wise Estimates Production of Vegetable Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Arbi/ Colacasia	0.0	4.1	10.9	0.0	0.0	0.0	66.7	0.0	11.0	117.3
Beans (All Including Lab- lab (Sem))	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.0
Bitter Gourd	0.0	3.3	0.0	0.0	0.4	0.0	0.0	0.0	1.8	37.0
Bottle Gourd	49.9	9.3	14.3	3.6	174.4	0.4	79.2	0.0	44.7	406.0
Brinjal	0.0	6.2	10.0	7.1	19.3	8.1	0.0	53.4	91.8	267.4
Cabbage	7.3	42.9	6.2	0.0	0.0	0.0	0.0	0.0	0.0	233.0
Carrot	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	45.0
Cauliflower	112.3	73.5	44.2	0.0	29.1	8.7	11.6	25.1	70.0	455.9
Green Chilly	1.1	0.4	8.6	13.3	41.0	56.4	5.6	17.5	23.7	216.0
Peas (Green)	0.0	204.9	0.0	3649.1	0.0	162.9	5.9	0.0	148.6	4597.2
Okra /Ladies Finger	79.5	39.3	24.8	0.0	48.3	1.1	0.0	0.0	3.2	217.8
Onion	0.0	28.0	6.5	32.3	0.0	0.0	3.5	591.1	0.0	491.7
Potato	63.8	888.1	1100.0	199.2	11140.7	452.1	1199.7	12688.4	306.1	27175.1
Kaddu/Pumpkin	0.0	0.0	26.9	0.0	0.0	0.0	0.0	459.6	0.0	296.9
Radish	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	5.3	31.9
Ridge/Sponge Gourd (Torai)	0.0	4.3	0.0	7.7	5.4	0.0	39.9	58.7	22.4	206.0
Tomato	0.0	11.8	21.5	183.0	34.8	91.7	3.1	124.5	0.0	553.5
Ash Gourd/Petha	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	4.8
Other Vegetables	0.0	207.0	376.0	204.2	84.8	136.4	642.7	530.0	1185.0	2933.7
Total	1528.3	1657.2	2885.5	6105.9	11715.2	1775.6	3189.6	14559.2	2946.2	44841.9

Table A4: District wise Estimates Production of Spice Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Coriander Seed	0.0	0.0	2.9	0.0	0.0	0.0	0.0	1.8	0.0	14.1
Fennel (Sauf)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Garlic	0.0	0.2	2.3	0.0	0.0	0.0	0.0	59.5	12.3	127.0
Red Chilly	1.1	0.4	8.6	13.3	41.0	56.4	5.6	17.5	23.7	216.0
Turmeric	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4
Total	5.7	0.8	12.8	13.5	66.2	55.8	5.5	112.1	40.5	379.8

Table A5: District wise Estimates Production of Flower Crops in Uttar Pradesh: 2019-20 (by Sample Survey), Final Estimates: Production in '000' Qlt

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Gladiolus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0
Marigold	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.8
Rose	0.0	0.0	0.0	0.5	0.0	1.1	0.0	64.0	0.0	1066.6
Total	0.0	0.0	0.0	1.2	0.0	1.0	0.0	75.6	0.0	1120.5

Table A6: District wise Productivity of Individual Crops in Fruits in Uttar Pradesh: 2017-18 Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Aonla/Gooseberry	44	44	43	44	44	44	45	45	42	44
Banana		181	177		199	183	183	173	178	181
Guava	62	50	57	40	70	85	102	83	88	74
Litchi	35	29			36				34	34
Mango	78	42	61	72	68	69	85	70	80	73
Muskmelon	108	104	106	109	104	107	104	104	104	104
Papaya		183		205	188			190	205	203
Watermelon		180	191		180		181	180	180	180
Jackfruit		103	99		100	99			99	101
Other Citrus					16	14			18	15
Other Fruits	46	44	59	58	62	74	74	76	72	63
Total	77	147	65	81	79	66	87	123	92	97

Sources:

Table A7: District wise Productivity of Individual Crops in Fruits on Sample Farms: 2019-20, Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Anola				34.0						34.0
Banana		250.0	100.3	192.5						137.8
Guava	8.0		89.3	4.0	47.9	24.5	20.0		0.0	31.5
Litchi	11.5									11.5
Mango	38.4	32.9	42.5	37.8			30.4		0.0	30.3
Musk melon			35.7							35.7

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Papaya			167.0							167.0
Water- melon		16.0								16.0
Lemon						32.9				31.7
Peach							25.0			25.0
Pomegranate				22.3						22.3
Raspberry					20.0					20.0
Others	11.5	16.0	101.3	22.5	20.0	32.9	25.0		0.0	30.4
Total	17.2	57.0	67.9	60.7	47.6	20.4	1.1		0.0	22.3

Sources: Primary Survey, 2019.

Table A8: District wise Productivity of Individual Crops in Vegetables in Uttar Pradesh: 2017-18 Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Arbi/ Colacasia	74	69	67	68	70		66	66	66	67
Ash Gourd/Petha			143		144					144
Beans		57	60	61	61		59	56	56	59
Bitter Gourd	73	69	82	84	80		72	82	81	75
Bottle Gourd	117	118	125	131	116	88	147	117	119	122
Brinjal	140	136	151	121	137	140		135	136	137
Cabbage	145	131	144	138	132			134		134
Carrot	103	100	140		102		83	101	102	101
Cauliflower	91	92	90	117	90	89	91	92	91	91
Green Chilly	10	10	10	10	10	10	10	10	10	10
Green Peas	44	41	40	54	63	42	39	54	41	51
Okra /Ladies Finger	57	55	50	50	54	85	51	55	53	54
Onion	62	57	55	64	72	73	79	63	76	63
Potato	92	97	91	101	100	101	97	104	104	101
Pumpkin	135	145	149	145	166			155		155
Radish	96	114	90	108	107	116		107	112	106
Ridge/Sponge Gourd (Torai)	85	90		91	98		97	91	98	93
Tomato	171	121	171	196	180	131	222	184		176
Pointed Gourd /Parwal	160	109	87		125	147		128		109
Sweet Potato	55	56	53		54		53	53	53	53
Turnip	138	136	120	120	116			128	136	130
Other Vegetables	105	68	132	127	62	103	77	114	118	100
Total	100	81	82	60	97	68	84	103	100	87

Sources: Primary Survey, 2019.

Table A9: District wise Productivity of Individual Crops in Vegetables on Sample Farms: 2019-20, Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Arbi (taro root)		50.0	50.0				75.3		64.0	67.3
Ash Gourd/Petha			56.7							56.7
Beans		14.0								14.0
Bitter gourd		52.3			10.0	20.0			21.9	34.3
Bottle Gourd	150.0	70.1	85.1	55.4	167.6	40.2	137.2		229.3	113.5
Brinjal		32.6	56.1	105.7	67.6	53.2	83.3	46.7	111.0	90.4
Cabbage	152.8	106.7	102.6				312.5			122.3
Carrot									53.1	53.1
Cauliflower	81.2	68.1	75.8		113.1	63.0	50.0	41.3	122.2	93.3
Green Chilly	30.0	30.0	60.0	22.7	35.0	16.0	27.8	26.2	39.8	31.1
Green peas		50.0		29.1		18.0	60.0		41.8	29.3
Lady finger	90.9	42.7	38.3		44.8	50.0			35.0	44.0
Onion		50.0	3.9	53.4			64.5	190.4		63.6
Potato	50.0	72.5	78.9	120.0	88.6	91.0	113.3	95.5	77.8	88.5
Pumpkin			62.9					166.7	92.0	88.0
Raddish			27.6						46.9	32.4
Ridge gourd		65.6	57.1	87.8	16.0	50.0	88.6	35.5	116.3	72.2
Tomato		51.4	65.5	77.3	60.0	83.0	125.8	72.4	140.0	84.2
Capsicum									43.5	43.5
Cucumber	118.1	136.4		60.0			150.0		80.0	109.9
Gwar					10.0					10.0
Mint							30.2			30.2
Soya			30.3							30.3
Spinach		80.0	28.9			33.3				34.0
Others	0.0	36.4	45.9	29.1	10.0	26.4	51.6	166.7	83.7	38.2
Total	85.0	63.2	70.3	44.1	82.6	70.6	109.9	93.9	115.8	74.7

Sources: Primary Survey, 2019.

Table A10: District wise Productivity of Individual Crops in Spices Crops in Uttar Pradesh: 2017-18 Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Coriander Seed	2.4	2.3	2.1	3.0	2.2			2.1	2.5	2.2
Fennel (Sauf)			4.0		3.7			3.6		3.7
Garlic		24.0	22.8		23.8			23.4	23.4	23.4
Red Chilly	3.5	3.2	3.2	3.3	3.3	3.2	3.2	3.2	3.2	3.2
Turmeric	12.1			12.0	12.0	12.0		12.0	12.0	12.1
Fenugreek	2.7	2.7	2.0		2.3			2.7		2.4
Ginger	20.8									20.8
Total	9.8	4.8	6.0	3.4	6.3	3.2	3.2	20.1	11.9	11.0

Sources: Primary Survey, 2019.

Table A11: District wise Productivity of Individual Crops in Spices on Sample Farms: 2019-20, Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Corriander			12.7					26.0		19.0
Sauf			6.7							6.7
Garlic		35.0	29.7					15.0	26.1	26.3
Chillies	30.0	30.0	60.0	22.7	35.0	16.0	27.8	26.2	39.8	31.1
Turmeric			42.9							42.9
Total	30.0	32.5	28.2	22.7	35.0	16.0	27.8	23.8	36.3	30.0

Sources: Primary Survey, 2019.

Table A12: District wise Productivity of Individual Crops in Flowers in Uttar Pradesh: 2017-18 Productivity (Qtl per Acer)

Name of Crops	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Gladiolus	50.0							50.0		50.0
Marigold	8.0				8.0			8.0		8.0
Rose	8.6	1.3		11.1	12.0	12.0		14.6		12.1
Total	39.8	27.9		11.1	17.6	12.0		18.6		18.4

Sources: Primary Survey, 2019.

Table A13: District wise Productivity of Individual Crops in Flower on Sample Farms: 2019-20, Productivity (Qtl per Acer)

Name of Crops	**Saharanpur**	**Gorakhpur**	**Sultanpur**	**Jalaun**	**Hathras**	**Mirzapur**	**Amroha**	**Kannauj**	**Rampur**	**Total**
Gladiolus				41.3						41.3
Marigold				34.1		77.7				49.0
Rose				14.0		111.1		33.9		50.1
Guldaudi				112.5						112.5
Jasmine								25.3		25.3
Mehendi								21.0		21.0
Rajnigandha				48.8						48.8
Tagarh						117.0				117.0
Udahul						148.8				148.8
Total				36.7		96.5		29.6		49.1

Sources: Primary Survey, 2019.

Chapter 5

Problems and Constraints Confronted by Growers of Horticulture Crops

Over the years the horticulture sector has emerged as a potential for the development of the agricultural sector. It offers a wide range of options to the farmers for crop diversification. It is clear from the foregoing analysis that there has been a substantial increase in area, production and productivity in major horticulture crops since last few years. However, the gaps in the horticulture development, in the State have been identified in this chapter. It is evident that horticulture sector would be competitive provided weaknesses are converted into opportunities. It was seen that in spite of all the efforts, the horticulture farmers or growers of the study district are facing lot of constraints in different areas which hamper the working environment of horticulture farming. The key difficulties are related to farmers in selling of the crops, finance, marketing, labour, storage, maintenance, knowledge and so on, which are elaborated below.

I: Status of Selling of Orchards

Table 5.1 reveals about the district wise distribution of selling of orchards before planting crops thus revealing that overall 21.9 percent of total respondents reported positively of selling their orchards before planting while 78.1 percent reported in denial. Further, the table states that out of total, highest proportion of (65 percent) sampled respondent accepted of selling of orchards before planting crops in Saharanpur District followed by Amroha (42 percent), Rampur (29 percent) and Gorakhpur (25 percent). Further, in all other districts it was found that maximum proportion of respondent reported of not selling their orchards before planting of the crops. This can be reported as good indicator for the sample farms.

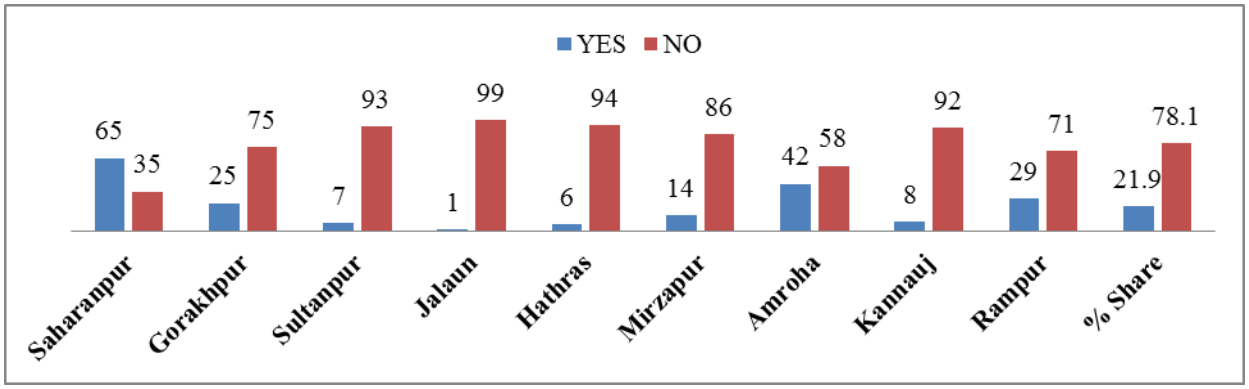
Table 5.1: Distribution of Sample Farms Reporting of Selling of Orchards (percent)

District	Sale of the Orchard before Plantation		To whom the Orchard was Sold			Total
	YES	NO	Big farmers	Trader	Money lenders	
Saharanpur	65.0	35.0	7.69	90.77	1.54	100
Gorakhpur	25.0	75.0	24.00	64.00	12.00	100
Sultanpur	7.0	93.0	28.57	57.14	14.29	100
Jalaun	1.0	99.0	0.00	100.00	0.00	100

District	Sale of the Orchard before Plantation		To whom the Orchard was Sold			Total
	YES	NO	Big farmers	Trader	Money lenders	
Hathras	6.0	94.0	33.33	50.00	16.67	100
Mirzapur	14.0	86.0	21.43	78.57	0.00	100
Amroha	42.0	58.0	7.14	92.86	0.00	100
Kannauj	8.0	92.0	0.00	87.50	12.50	100
Rampur	29.0	71.0	10.34	79.31	13.79	100
Total	21.9	78.1	12.18	82.74	5.58	900

Source: Primary Survey, 2019.

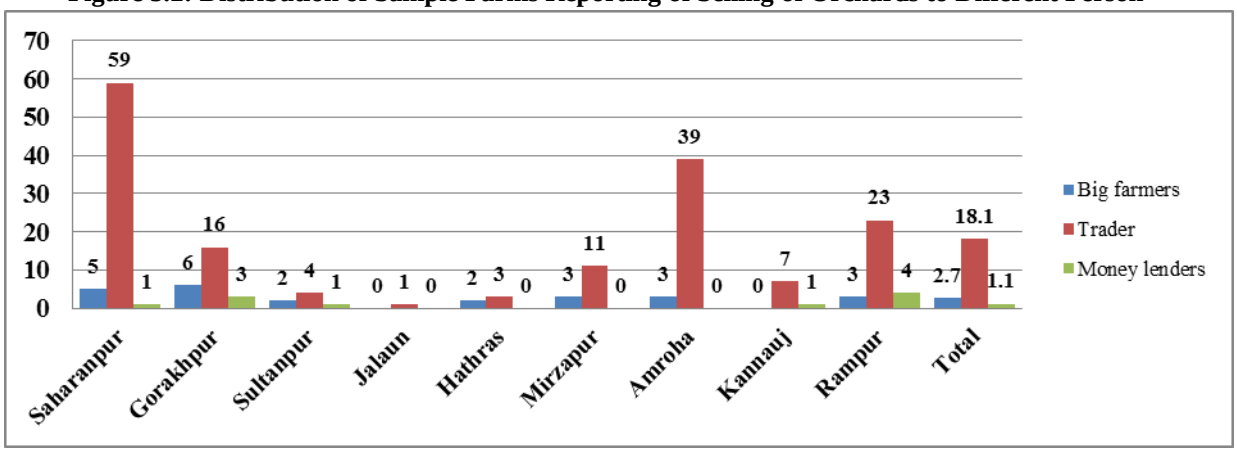
Figure 5.1: Distribution of sampled grower reporting of selling of orchards before Plantation



Source: Primary Survey, 209.

Further, the Table 5.1 also reveals about the district wise distribution of sample farms reporting of selling orchards to different person such as to big farmers, traders or money lenders. The table shows that out of 21.9 percent revealed of selling their orchards and maximum number of respondents told of selling their orchards to traders i.e. 18.1 percent followed by big farmers (2.7percent) and money lenders (1.1percent). This shows that most of the respondent sells their orchards to traders.

Figure 5.2: Distribution of Sample Farms Reporting of Selling of Orchards to Different Person



Source: Primary Survey, 2019.

Table 5.2 shows the distribution of sample farms on basis of time of sale of orchard. The table reflects upon the fact that out of total sample respondents (21.9 percent) who reported to selling their orchards before plantation, 17.0 percent of the respondents talked about selling their orchards before having flowers. Districts Saharanpur, Gorakhpur, Sultanpur, Amroha and Rampur reported of selling their orchads before having flowers. Jalaun reported of selling its orchards completely (100 percent) before having flowers. Only 2.7 percent of total sample revealed of selling their orchards after having flowers and 2.2 percent revealed of selling their orchards after fruits is ripe.

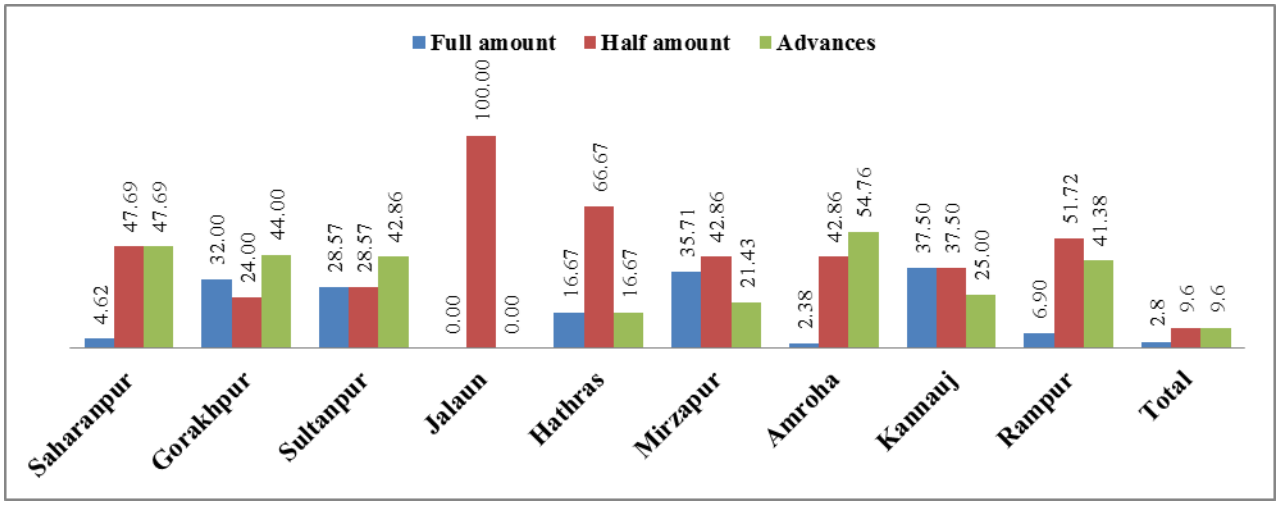
Table 5.2: Distribution of sample farms on basis of time of sale of orchard (in percent):

Time of sale of orchards				Amount Received against sale of orchards			
District	**Before flower**	**After flower**	**After fruit ripe**	**Full amount**	**Half amount**	**Advances**	**Total**
Saharanpur	81.54	13.85	4.62	4.62	47.69	47.69	100
Gorakhpur	76.00	4.00	20.00	32.00	24.00	44.00	100
Sultanpur	42.86	14.29	42.86	28.57	28.57	42.86	100
Jalaun	100.00	0.00	0.00	0.00	100.00	0.00	100
Hathras	33.33	50.00	16.67	16.67	66.67	16.67	100
Mirzapur	50.00	28.57	21.43	35.71	42.86	21.43	100
Amroha	97.62	2.38	0.00	2.38	42.86	54.76	100
Kannauj	37.50	25.00	37.50	37.50	37.50	25.00	100
Rampur	82.76	10.34	6.90	6.90	51.72	41.38	100
Total	**17(77.63)**	**2.7(12.33)**	**2.2(10.05)**	**2.8(12.79)**	**9.6(43.84)**	**9.6(43.84)**	**900**

Source: Primary Survey, 2019.

Further Explanation in Table 5.2 states that the total amount received against the sale of orchards, it shows that 9.6 percent of total sample farms selling orchards received half amount and advances against the sale whereas a small percentage of just 2.8 percent receive full amount of money at the time of sale. In Saharanpur district, 47.69 percent receive full amount and advances for selling their orchards. In Jalaun district only 1 respondent sold his farm by receiving half amount as advance. Overall, the proportion of full amount received at the time of sale is less in sampled district.

Figure 5.3: Distribution of sampled farms on basis of Amount received against sale of orchard:



Source: Primary Survey, 2019.

Table 5.3 explains about the distribution of sample farms who reported of taking care of orchards after sale. Maximum 18.2 percent of total reported of traders who take care of the orchards after purchasing these orchards. Only 2.8 percent of farm owners who take care of the farms themselves even after its sale. It is to be noticed that 0.9 percent reported of keeping servants for taking care of the orchards after the sale.

Table 5.3: Distribution of Sample reporting of Taking Care of Orchard after Sale:

District	Farm owner	Trader	Servant	Total	No. of HH
Saharanpur	2.0	61.0	2.0	65.0	100
Gorakhpur	6.0	16.0	3.0	25.0	100
Sultanpur	2.0	5.0	0.0	7.0	100
Jalaun	0.0	1.0	0.0	1.0	100
Hathras	0.0	6.0	0.0	6.0	100
Mirzapur	1.0	13.0	0.0	14.0	100
Amroha	7.0	33.0	2.0	42.0	100
Kannauj	4.0	4.0	0.0	8.0	100
Rampur	3.0	25.0	1.0	29.0	100
Total	2.8	18.2	0.9	21.9	900

Source: Primary Survey, 2019.

Table 5.4 explains the duration of selling orchards and shows that most of the respondent i.e. 12.1 percent sell their land for maximum period of two years. Only 9.0 percent of total percent selling their land reveals of selling for maximum period of 1 year. Only 0.8 percent owners reported of selling their orchards for less than 6 months.

Table 5.4: Duration of Selling of Orchards:

District	For 6 months	For 1 year	For 2 years	Total	No. of HH
Saharanpur	3.0	11.0	51.0	65.0	100
Gorakhpur	3.0	18.0	4.0	25.0	100
Sultanpur	0.0	3.0	4.0	7.0	100
Jalaun	0.0	1.0	0.0	1.0	100
Hathras	0.0	4.0	2.0	6.0	100
Mirzapur	1.0	11.0	2.0	14.0	100
Amroha	0.0	11.0	31.0	42.0	100
Kannauj	0.0	7.0	1.0	8.0	100
Rampur	0.0	15.0	14.0	29.0	100
Total	0.8	9.0	12.1	21.9	900

Source: Primary Survey, 2019.

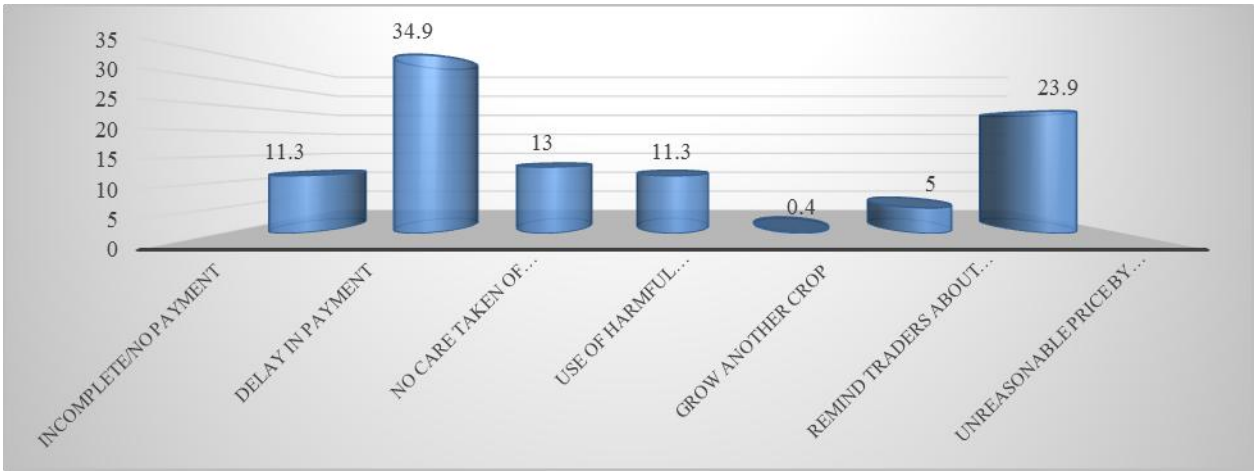
Table 5.5 reveals about the problems faced by the farmers during the sale of the orchards. It shows that 34.9 percent reported problem of delayed payment which was highest in Amroha (53.5 percent) district followed by Saharanpur (50 percent), Jalaun (35.7 percent) and Rampur (33.3 percent). Only 10 percent reported of delayed payment in Sultanpur District. Further to congregate the problem 23.9 percent of total sampled farms stated about the problem of unreasonable prices being charged by traders and 13 percent reported about the problem that their farms which they sell are not taken proper care. Nearly 11.0 percent revealed about using of harmful pesticides and incomplete payment. 0.4 percent of farms revealed about facing problem of growing another crop. Hence this can be said that almost all the sampled respondent in selected district reported of facing some problem pr the other during the time of sale of orchards.

Table 5.5: Type of Problems Faced During Selling and Marketing of Orchards

Problems	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Incomplete/No payment	14.3	13.3	0.0	14.3	50.0	21.1	2.3	5.3	7.7	11.3
Delay in payment	50.0	16.7	10.0	35.7	12.5	15.8	53.5	21.1	33.3	34.9
No care taken of farm/trees	14.3	20.0	0.0	21.4	0.0	21.1	18.6	0.0	5.1	13.0
Use of harmful pesticides	10.7	20.0	0.0	0.0	25.0	10.5	18.6	0.0	7.7	11.3
Grow another crop	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
Remind traders about the payment	1.8	3.3	10.0	21.4	0.0	15.8	0.0	5.3	5.1	5.0
Unreasonable price by traders	8.9	23.3	80.0	7.1	12.5	15.8	7.0	68.4	41.0	23.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Figure 5.4: Type of Problems Faced During Selling and Marketing of Orchards (in percent)



Source: Primary Survey, 2019.

Table 5.6: Sampled farms reporting of having Deals between them and the Trader:

District	YES	NO	Total
Saharanpur	59.0	41.0	100
Gorakhpur	15.0	85.0	100
Sultanpur	4.0	96.0	100
Jalaun	2.0	98.0	100
Hathras	5.0	95.0	100
Mirzapur	15.0	85.0	100
Amroha	36.0	64.0	100
Kannauj	3.0	97.0	100
Rampur	21.0	79.0	100
Total (Reporting)	160	740	900
percent Share	**17.8**	**82.2**	**100.0**

Source: Primary Survey, 2019.

Table 5.6 reveals about the percentage of total respondents reporting of having any sort of deals with the traders during the sale of orchards. Only 17.28 percent reported of having such deals with traders while 82.2 percent negated about this querry by our field staff.

Further, in below table 5.7 various reasons are put forth by the farmers for having any sort of deals between themselves and the traders during the sale of the orchards and it was found that 41.7 percent respondent reported of using crops for their own use while 24.8 percent made a deal to of enjoying full payment on time and further, 13 percent revealed of making deal that irrigation, plantation etc should be done by the traders themselves while 8.3 percent revealed

of making promise of having payment before cutting of the crops. Hence, more or less every respondent revealed of facing problem in regard of sale of orchards.

Table 5.7: Type of Reasons given by sampled Respondent for having Deals between Traders

	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Payment before crop cutting	12.5	0.0	0.0	0.0	22.2	11.1	3.4	0.0	6.5	8.3
Irrigation, soiling, plantation etc should be done by the trader	16.1	34.6	20.0	50.0	11.1	5.6	1.7	0.0	12.9	13.9
Full payment on time	25.9	19.2	40.0	25.0	11.1	22.2	31.0	0.0	19.4	24.8
crops for self use	33.9	38.5	40.0	25.0	55.6	55.6	48.3	0.0	54.8	41.7
Use of appropriate of pesticides	9.8	3.8	0.0	0.0	0.0	0.0	13.8	0.0	0.0	7.5
No harm to crops/trees	1.8	3.8	0.0	0.0	0.0	5.6	1.7	100.0	6.5	3.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Most of the sampled population revealed of selling their crops before harvesting. Hence, it is important to analyze the status of respondent who stated of its beneficiality in selling crops before harvesting. Table 5.8 captures the responses put forth by the growers, nearly 78 percent reported of not having any beneficial experience from selling crops before harvesting while 21.6 percent revealed of having benefits from selling their crops before harvesting. It is thus, clear from the table that most of respondents in all districts do not find any type of benefits from selling crops before harvesting.

Table 5.8: Distribution of Sampled Population who reported of Benefits of selling Crops before Harvesting:

District	YES	No	No. of HH
Saharanpur	52.0	48.0	100
Gorakhpur	37.0	63.0	100
Sultanpur	19.0	81.0	100
Jalaun	4.0	96.0	100
Hathras	7.0	93.0	100

District	YES	No	No. of HH
Mirzapur	16.0	84.0	100
Amroha	37.0	63.0	100
Kannauj	2.0	98.0	100
Rampur	20.0	80.0	100
Total	21.6	78.4	900

Source: Primary Survey, 2019.

There are different reasons given by sampled farms while reported of having benefits from selling their crops before harvesting where 31.4 percent revealed of saying that they have nothing much to do with the crops, whereas, 9.3 percent reported of having good profit and getting reasonable prices by selling crops before harvesting. 18 percent stated of having no fear of loss by selling their crops. It is to be noticed that 19.0 percent revealed of selling their crops before harvesting as they said that their personal demands are fulfilled after the payment is received. Thus, the table 5.9 reveals of different type of benefits enjoyed by sampled farms by selling their crops before harvesting.

Table 5.9: Type of Benefits Explained by Sampled Population Due to Selling Crops before Harvesting:

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Farming expenses reduces	7.7	0.0	5.3	0.0	14.3	0.0	2.7	0.0	0.0	3.6
Nothing much left to do	38.5	18.9	10.5	75.0	42.9	56.3	35.1	0.0	20.0	31.4
Helps in taking care of other crops	7.7	10.8	0.0	0.0	0.0	18.8	2.7	0.0	10.0	7.2
Good profit/reasonable amount	15.4	5.4	0.0	0.0	28.6	0.0	2.7	0.0	25.0	9.3
Full payment is made, no use of labor force	21.2	5.4	0.0	0.0	14.3	0.0	2.7	0.0	5.0	8.2
No fear of loss	5.8	8.1	10.5	0.0	0.0	6.3	21.6	0.0	35.0	12.4
No investment required	3.8	5.4	5.3	0.0	0.0	0.0	27.0	0.0	5.0	8.2
Personal demands are fulfilled after payment is received	0.0	45.9	68.4	25.0	0.0	18.8	5.4	100.0	0.0	19.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

II: Constraints in Selling and Marketing of All Horticulture Crops

The selling and market related challenges are the main problem in improving the economic status of horticulture producers from small growers to large. These challenges are being faced by growers of horticulture crops in world wide. Most of the farmers in the selected district have faced the problems related to selling of their horticulture products. The growers of horticulture crops basically find it very hard to selloff their produce to the ultimate customers and as a result sell the crops to the traders leave them with lesser profits. Due to absence of a proper marketing and selling policy and channels to assist the farmers of the district, the productivity of the crops is being affected. The selling and marketing problems arise mainly due to various reasons. Therefore, the marketing and selling of horticulture produce lack the modern technique of selling off the products in a systematized way. Hence it is important to solve the problems of the growers which are being faced by them while selling the crops. On the same context, Table 5.10 explains the problem faced by the sample farms while selling the crops where maximum 88.8 percent of total respondents accepted of facing the problem in selling the crops where more than 90 percent of respondent from Jalaun, Hathras, Kannauj, Rampur and Sultanpur accepted of having problem while selling the crops. This table gives surety by all district of facing problem while selling the crops of various horticulture crops either it be foodgrains, fruits, vegetables, spices or other crops.

Table 5.10: Distribution of Sample farms facing Problem while selling the Crops (in percent):

District	YES	No	Total
Saharanpur	82.0	18.0	100.0
Gorakhpur	89.0	11.0	100.0
Sultanpur	92.0	8.0	100.0
Jalaun	96.0	4.0	100.0
Hathras	96.0	4.0	100.0
Mirzapur	83.0	17.0	100.0
Amroha	79.0	21.0	100.0
Kannauj	92.0	8.0	100.0
Rampur	90.0	10.0	100.0
Total	88.8	11.2	100.0

Source: Primary Survey, 2019.

Table 5.11 explains the problems faced by the farmers while selling of the food grains where it shows that maximum 12.9 percent of total sample size face problem regarding prices measurement information in selling of food grain crops, while nearly 11 percent face problem of low market availability and bad behavior of traders. Most of the farmers revealed of selling

their crops to traders that too unwillingly. Transportation and irrigation problems are also found to be faced by farmers in selling of the foodgrains crops. 9 percent revealed about the lack of availability of labour for selling the crops and 3.4 percent also accepted problem of cold storage for foodgrains crops. In all districts, the major problem was selling of their crops to traders that too unwillingly.

Table 5.11: Type of Problem Faced while selling the Food grain crops (in percent):

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculturable land	5.2	6.9	6.6	8.1	8.3	9.0	4.9	7.8	8.2	7.4
Irrigation prob.	10.7	9.7	10.3	11.4	12.0	11.7	10.3	11.7	10.4	10.9
Prob. in getting loan	5.8	8.4	7.2	8.9	7.0	9.2	5.4	7.3	7.5	7.6
Prob. in paying loan	4.5	6.7	7.0	6.9	7.0	7.8	4.0	7.3	7.0	6.6
Lack of labour	7.9	8.0	8.7	10.6	9.9	9.4	8.9	10.9	9.2	9.4
Transportation prob.	8.2	9.9	11.3	10.0	10.4	9.6	8.9	11.3	10.4	10.1
Coldstorage prob.	3.1	4.3	2.6	3.7	3.6	2.7	3.4	2.7	4.1	3.4
Loading prob.	5.8	9.0	10.1	8.4	8.5	8.0	5.2	8.0	6.8	8.0
Traders behavior prob.	15.1	12.2	11.1	10.3	10.8	10.1	16.0	10.5	12.1	11.7
Prices measurement info	17.5	12.7	12.7	11.3	11.6	11.9	17.2	11.7	12.6	12.9
Market availability prob.	16.2	12.2	12.3	10.5	10.8	10.5	15.8	10.7	11.6	11.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100

Source: Primary Survey, 2019.

Table 5.12 explains the major constraints faced by the farmers in selling fruits crops and shows that most of the farmers reported of lack of proper information/ awraeness regarding prices prevailing/measurement, while 10.0 percent reported of problem of irrigation, marketing, and problem derived due to poor behavior of the traders while selling the fruits crops. Fruits crops are perishable in nature hence, cold storage problem also emerged as the next important issue closely followed by the problem of transportation of products.

Table 5.12: Type of Problem faced by farmers while selling the Fruits crops (in percent):

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculturable land	5.6	10.4	4.9	9.5	6.1	8.8	7.5	0.0	8.2	7.4
Irrigation prob.	9.7	10.0	7.8	11.9	11.2	12.0	9.4	0.0	9.8	10.4
Prob. in getting loan	6.0	8.5	7.8	7.1	6.5	7.9	7.5	0.0	8.2	7.2
Prob. in paying loan	3.6	8.5	3.9	7.1	6.5	5.1	7.5	0.0	8.2	5.9
Lack of labour	10.5	9.5	10.7	9.5	10.5	7.9	7.5	0.0	9.8	9.7
Transportation prob.	8.5	8.5	12.6	7.1	11.6	9.7	9.4	0.0	8.2	9.8
Coldstorage prob.	9.7	9.0	8.7	7.1	6.8	6.5	5.7	0.0	9.8	8.0
Loading prob.	6.9	8.5	6.8	9.5	8.2	7.9	7.5	0.0	8.2	7.8
Traders behavior prob.	12.5	9.0	10.7	7.1	10.5	9.7	13.2	0.0	9.8	10.5
Prices measurement info	15.3	9.5	14.6	11.9	11.2	12.5	13.2	0.0	9.8	12.3
Market availability prob.	11.7	8.5	11.7	11.9	10.9	12.0	11.3	0.0	9.8	10.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0

Source: Primary Survey, 2019.

Table 5.13 shows the problems faced by the farmers while selling of the vegetable crops. It can be derived that the most acutely felt constraints is the irrigation problem and lack of information regarding prices measurements. The constraints of irrigation also affected some cultivators particularly to those districts with less irrigation facility. 11.1 percent of farmers also complain about the lack of market availability while selling of the vegetable crops. Transportation and lack of labour availability in Vegetable production and selling of the produce was also mentioned as a problem by a good number of vegetable crops. Hence, this can be said that most of the farmers face problem in selling of the produce of vegetable crops.

Table 5.13: Type of Problem faced by farmers while selling the Vegetables crops (in percent):

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculturable land	5.5	6.8	7.1	7.6	7.7	8.6	5.4	7.4	7.8	7.3
Irrigation prob.	12.1	10.1	10.3	11.8	11.5	11.5	11.1	12.1	10.4	11.1
Prob. in getting loan	2.2	8.5	9.1	7.7	5.8	7.7	7.0	6.3	9.7	7.6
Prob. in paying loan	3.3	6.0	5.9	5.7	5.8	6.2	4.3	6.3	6.2	5.8
Lack of labour	8.8	8.0	7.7	9.7	10.6	9.4	11.4	10.0	10.4	9.5

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Transportation prob.	8.8	8.9	10.2	9.1	10.3	8.6	10.0	10.4	9.2	9.6
Coldstorage prob.	11.0	8.2	8.2	9.4	9.1	7.4	7.6	7.4	9.2	8.5
Loading prob.	4.4	7.5	8.0	6.9	8.4	7.4	5.4	7.6	6.2	7.2
Traders behavior prob.	12.1	11.6	10.3	9.9	9.3	10.0	12.5	10.2	10.4	10.5
Prices measurement info	14.3	12.6	11.8	11.5	11.2	12.1	13.0	11.9	10.4	11.8
Market availability prob.	17.6	11.9	11.4	10.8	10.3	11.2	12.2	10.4	10.1	11.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

In case of Flower crops, lack of Irrigation facility, lack of labour, lack of information regarding price measurement and lack of market availability emerge as a major constraint in selling of the flower crops. Flower cultivation was mainly found in Gorakhpur, Jalaun, Mirzapur, Kannauj and Rampur district of the selected sampled district. The problem of cold storage facilities was felt strongly as the flower need proper storage after the produce is ready after harvesting. 9 percent of the respondent also reveals of facing the transportation problem. Hence, it can be said that all the districts under flower cultivation face more or less problem in selling of the produce. Hence, proper measures should be taken in order to solve the problems facing by farmers in flower production.

Table 5.14: Type of Problem faced by farmers while selling Flowers crops (in percent):

District	Gorakhpur	Jalaun	Mirzapur	Kannauj	Rampur	Total
Agriculturable land	4.8	5.7	9.6	7.3	0.0	7.5
Irrigation prob.	8.4	12.5	13.0	12.1	15.4	12.5
Prob. in getting loan	4.0	8.0	6.2	6.9	0.0	6.8
Prob. in paying loan	4.0	5.7	6.2	7.3	0.0	6.6
Lack of labour	9.7	11.4	11.6	11.8	15.4	11.7
Transportation prob.	9.3	11.4	8.2	8.5	15.4	9.0
Coldstorage prob.	10.6	5.7	4.8	5.7	0.0	5.4
Loading prob.	7.5	5.7	6.2	7.9	7.7	7.1
Traders behavior prob.	12.3	11.4	9.6	10.0	15.4	10.2
Prices measurement info	16.7	11.4	12.3	12.1	15.4	12.0
Market availability prob.	12.8	11.4	12.3	10.6	15.4	11.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Table 5.15 explains the constraints faced by farmers while selling of the spice crops in the selected districts where it was found that most of the farmers face problem of information regarding price measurements. In order to sell spice crops, maximum farmers also reveal of facing marketing problem and lack of availability of proper market. Irrigation problem was also faced by farmers under spice cultivation. Hence, to sum up, the foremost constraints before farmers in selling of the various horticulture crops, most of the farmers face problem of information regarding prices and irrigation problem followed by less availability of market. Significantly, the problem of availability of credit and loan repayment was not felt as serious constraints by most of our respondents. The problem of cold storage facilities was also felt very strongly as the farmers prefer to sell their produce at the time of harvesting to receive ready money.

Table 5.15: Type of Problem faced by farmers while selling Spices crops:

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculturable land	9.7	8.6	8.0	8.2	8.3	6.6	6.7	9.0	8.3	8.1
Irrigation prob.	12.9	11.4	11.0	11.3	12.5	10.5	12.6	13.5	10.5	11.4
Prob. in getting loan	6.5	11.4	9.0	8.2	4.2	7.9	9.2	5.4	7.0	7.7
Prob. in paying loan	6.5	5.7	8.0	5.6	4.2	5.3	5.9	5.4	4.4	5.5
Lack of labour	9.7	8.6	10.0	9.7	12.5	10.5	9.2	9.9	10.5	10.0
Transportation prob.	12.9	8.6	11.0	8.7	12.5	10.5	8.4	10.8	9.8	9.8
Coldstorage prob.	0.0	2.9	2.0	9.7	0.0	6.6	5.0	6.3	6.0	5.9
Loading prob.	9.7	8.6	8.0	5.6	12.5	9.2	7.6	5.4	5.1	6.6
Traders behavior prob.	6.5	11.4	11.0	9.7	8.3	10.5	10.1	9.9	12.1	10.6
Prices measurement info	12.9	11.4	11.0	11.8	12.5	11.8	13.4	13.5	13.3	12.6
Market availability prob.	12.9	11.4	11.0	11.3	12.5	10.5	11.8	10.8	13.0	11.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

III: Competition Faced by Farmers Under Various Horticulture Crops:

Farmers producing various horticulture crop are confronted with tough competitions regarding different prevailing prices, quality and its variety. Hence, it is important to analyze and reflect upon the competition faced by them in context of price, quality and variety involved in production and marketing horticulture crops.

Keeping track of the situation the table 5.16 below, explains the competition faced by farmers under foodgrain crops in selected districts of the sample. It shows that maximum competition is faced by Gorakhpur district where major competition under production of foodgrain crop is regarding its variety followed by its quality and price. Nearly 12.5 percent of farmers reported of competition faced by them in Sulatanpur and Jalaun district, where the major competition is of its variety and quality. Near about 10 percent of farmers proclaimed of facing competition regarding price, quality and its variety in Hathras, Mirzapur, Amroha, Kannauj, Rampur and Saharanpur districts. Hence, it can be said that more or less all the farmers in selected districts face some form of competition or the other under Food grains crops.

Table 5.16: Type of Competition faced by Growers under Food grain crops:

District	Price	Quality	Variety	Total
Saharanpur	10.6	9.8	8.1	9.5
Gorakhpur	14.5	14.8	15.0	14.7
Sultanpur	12.0	12.2	12.4	12.2
Jalaun	12.3	12.6	12.6	12.5
Hathras	10.6	10.7	11.1	10.8
Mirzapur	10.0	9.7	10.4	10.0
Amroha	10.9	10.6	10.9	10.8
Kannauj	9.8	10.2	10.4	10.1
Rampur	9.3	9.5	9.2	9.3
Total	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Figure 5.5: Type of Competition faced by Growers of Food grain crops

Source: Primary Survey, 2019.

Table 5.17 state about the competition faced by the farmers under Fruit crops where 25.6 percent of total sampled farms face competition in Saharanpur district and the major competition relates to its quality and its variety. Further, Hathras and Mirzapur districts revealed of having competition under fruit crops in relation to its variety and its quality. Lowest competition was faced by Rampur and Jalaun district and Kannauj has no cultivation of fruit crops hence, the percentage is nil there. This shows that other than Kannuaj most of the districts faces competition in regards to the variety of fruit cultivation. Hence, proper measures should be suggested so as to improve the quality and variety of different fruits crops.

Table 5.17: Type of Competition Faced by Growers under Fruits crops:

District	Price	Quality	Variety	Total
Saharanpur	26.3	26.2	24.3	25.6
Gorakhpur	13.2	13.8	13.9	13.6
Sultanpur	6.6	6.9	6.9	6.8
Jalaun	3.9	4.1	4.2	4.1
Hathras	21.7	21.4	21.5	21.5
Mirzapur	18.4	17.9	19.4	18.6
Amroha	5.3	5.5	5.6	5.4
Kannauj	0.0	0.0	0.0	0.0
Rampur	3.9	4.1	4.2	4.1
Total	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Figure 5.6: Type of Competition faced by Growers under Fruits Crops:

Source: Primary Survey, 2019.

Similar exercise has been done for vegetable grower as well and Table 5.18 explains the competition faced by the farmers under vegetable crops. It was found that maximum competition was reported by vegetable growers of Jalaun district i.e. 16.4 percent where the major competition is of variety of the vegetable products followed by its quality and its price. Further, Gorakhpur, Sultanpur and Hathras districts reported of facing competition in regard price, quality and variety of vegetable production. Saharanpur growers revealed of facing least competition under vegetable crops. To sum up, maximum districts were examined of having huge competition in relation to its variety and quality, hence proper efforts should be made to improve the condition of vegetable growers in the State.

Table 5.18: Type of Competition Faced by Growers under Vegetables crops:

District	Price	Quality	Variety	Total
Saharanpur	3.6	3.9	2.4	3.3
Gorakhpur	14.3	14.5	14.8	14.5
Sultanpur	14.1	14.3	14.6	14.3
Jalaun	16.2	16.2	16.8	16.4
Hathras	14.5	13.7	13.0	13.8
Mirzapur	8.6	8.5	8.9	8.7
Amroha	8.8	8.7	9.1	8.8
Kannauj	10.9	10.8	11.2	11.0
Rampur	9.1	9.3	9.3	9.2
Total	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Figure 5.7: Type of Competition faced by Growers of Vegetables Crops:

Source: Primary Survey, 2019.

Major competition under flower crops is faced by Kannauj district where 53.5 percent revealed of facing competition regarding its price followed by quality and variety. Further,

Mirzapur and Gorakhpur districts face competition mainly of variety of flowers. Thus, the table 5.19 reveals about the competition faced by the growers of flowers in relation to its price, quality and mainly variety of flowers.

Table 5.19: Type of Competition faced by Growers under Flowers Crops:

District	Price	Quality	Variety	Total
Gorakhpur	16.9	23.1	29.4	23.0
Jalaun	12.7	13.8	13.2	13.2
Mirzapur	28.2	27.7	29.4	28.4
Kannauj	53.5	52.3	51.5	52.5
Rampur	18.3	16.9	13.2	16.2
Total	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Table 5.20: Type of Competition Faced by Growers under Spices Crops:

District	Price	Quality	Variety	Total
Saharanpur	3.1	3.2	3.1	3.1
Gorakhpur	3.1	3.2	3.1	3.1
Sultanpur	8.5	8.9	8.6	8.7
Jalaun	17.8	17.7	18.0	17.8
Hathras	2.3	2.4	2.3	2.4
Mirzapur	7.8	8.1	7.8	7.9
Amroha	14.0	13.7	14.1	13.9
Kannauj	11.6	10.5	10.9	11.0
Rampur	31.8	32.3	32.0	32.0
Total	100.0	100.0	100.0	100.0

Source: Primary Survey, 2019.

Similarly, the competition faced under spices crops are examined in table 5.20 where in Jalaun district 18 percent of spice growers revealed of struggling under stiff competition in regard to its variety and nearly 17 percent revealed about its price and quality with regard to spice crops cultivation. Major growers in Amroha district also face competition in regard of its price. On the whole, it can be said that maximum number of growers of different horticulture crops experienced stiff competition regarding its variety, quality and its prices. Hence, efforts should be taken in order to control the price of the crops, and to improve the quality of the various horticulture crops and also to increase different variety of the crops so as to improve the condition of the growers of horticulture crops and provide support in the development of agriculture sector.

IV: Compensation for loss:

To help producers of horticulture crops government is known for its efforts to compensate them in times of heavy losses that they face in times of mis-happening whether climatic turmoil or natural clamaity. We also enquired about the losses that are respondents experienced and whether they were able to convince the government organization to receive compensation in case loss occurrence. Table 5.21 explains about the no. of sample farms who reported of getting compensation for the loss of crops from any government organization. Out of total sample size, maximum 98.1 percent of farmers reported of not receiving any type of compensation for losses in crop production from any type of government organization. Only 1.9 percent reported about receiving compensation for loss of their crops.

Table 5.21: No. of Sample Farms getting Compensation for Loss of Crops from any Government Organisation

District	YES	NO	Total
Saharanpur	4.0	96.0	100
Gorakhpur	3.0	97.0	100
Sultanpur	1.0	99.0	100
Jalaun	6.0	94.0	100
Hathras	3.0	97.0	100
Mirzapur	0.0	100.0	100
Amroha	0.0	100.0	100
Kannauj	0.0	100.0	100
Rampur	0.0	100.0	100
Total	**1.9**	**98.1**	**900**

Source: Primary Survey, 2019.

Further, the table 5.22 explains about the crops for which the compensation received for loss where in Saharanpur district, maximum loss is covered for crop named mango and Litchi. Maximum loss is covered for wheat in Gorakhpur, Jalaun and Hathras district. Thus, it can be concluded that only a small number of crops are covered for compensation for any loss by any government organization.

Table 5.22: Name of Crop for which Compensation Received

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Total
Mango	3	0	0	0	0	3
Sugarcane	0	0	0	0	1	1
Wheat	0	2	0	1	2	5
Paddy	0	0	1	0	0	1
Peanuts	0	1	0	0	0	1
Tomato	0	0	0	3	0	3
Green peas	0	0	0	1	0	1
Gladiolus	0	0	0	1	0	1
Litchi	1	0	0	0	0	1
Total	4	3	1	6	3	17

Source: Primary Survey, 2019.

Table 5.23 reveals about the name of organization by which the compensation is received for loss of the crops and it can be seen that the maximum help was given by the Agriculture/ Horticulture department followed by Jila Udhyan Kendras and Government. It can be seen that RajashyaVibagh has also provided compensation to selected districts for loss of the crops. PM Kisaan SamaanYojana has shown no role in providing compensation for loss of the crops in the selected districts.

Table 5.23: Organization by which Compensation Received:

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Total
JilaUdhyan Kendra	3	0	0	0	1	4
PM KisaanSamaanYojna	0	0	0	0	0	0
RajasyaVibhag	0	2	0	0	0	2
Government	0	1	1	1	2	5
Agriculture/Horticulture department	1	0	0	5	0	6
Total	**4**	**3**	**1**	**6**	**3**	**17**

Source: Primary Survey, 2019.

V: Credit and Finance:

Finance is one of the major problems faced by the growers or farmers of horticulture crops in the selected districts. It was observed that the finance is the main factor which decides the ability to take up horticulture farming as one's occupation. In the same context, Table 5.24 elaborates about the percentage of respondents those who have taken loan for growing such crops and highlights that nearly, about 49 percent growers reported of taking loan while about 50.8 percent reported of not taking any loan. It was seen that out of total who have taken loan maximum 74 percent of respondents in Amroha district reported taking laons and only 26 percent said 'No they have not taken any loan'. In Mirzapur district, the proportion of respondents taking loan for crop growing is lower compared to other districts. Near about half of the respondent i.e. 49.2 percent revealed of taking credit from different sources. Further it is pertinent also to enquire or examine the sources from where the credit have been sort. Table 5.24 states that maximum 83.1 percent respondents reported of taking credit from financial institutions (Banks) which can be regarded as a good indicator of living. Further, 2.7 percent revealed of taking credit from Businessmen followed by Middlemen. 12.9 percent stated of taking loan from other sources which may be through relatives and friends.

Table 5.24: Sampled farms reporting of Credit taken for Gardening and Source of Credit taken (in percent)

Have you taken credit			Different source of credit taken				
District	**Yes**	**No**	**Bank**	**Business man**	**Middlemen**	**Others**	**No. of HH**
Saharanpur	37.0	63.0	86.5	2.7	8.1	2.7	100
Gorakhpur	36.0	64.0	47.2	22.2	2.8	27.8	100
Sultanpur	42.0	58.0	64.3	2.4	4.8	28.6	100
Jalaun	51.0	49.0	82.4	0.0	0.0	17.6	100
Hathras	59.0	41.0	89.8	0.0	0.0	10.2	100
Mirzapur	35.0	65.0	91.4	0.0	0.0	8.6	100
Amroha	74.0	26.0	95.9	1.4	0.0	2.7	100
Kannauj	40.0	60.0	80.0	2.5	0.0	17.5	100
Rampur	69.0	31.0	89.9	0.0	0.0	10.1	100
Total	49.2	50.8	83.1	2.7	1.4	12.9	900

Source: Primary Survey, 2019.

In table 5.25, 24.7 percent of total respondents reported of paying off their loan or credit by selling their crops to them and giving their crops to lender. While it is important to notice that maximum 75.3 percent reported of not selling their crops in order to pay off their loan. The respondents gave many reasons for paying off their loan in forms of by selling their animals, by making payments after selling crops, by installments etc.

Table 5.25: Percentage of respondent who reported of giving crops to lenders/ selling crops in order to pay off loan and the reasons given in order to pay off loan:

percent who reported of selling crops in order to pay off loan			Reasons given by respondents in order to pay off of loan					
District	**YES**	**No**	**Sell to same middlemen from whom received the payment**	**Installments**	**Payment after selling the crops**	**Full payment**	**By selling animals**	**No. of HH**
Saharanpur	11.0	89.0	27.3	36.4	27.3	9.1	0.0	100
Gorakhpur	20.0	80.0	0.0	35.0	65.0	0.0	0.0	100
Sultanpur	16.0	84.0	0.0	25.0	62.5	12.5	0.0	100
Jalaun	42.0	58.0	0.0	64.3	31.0	0.0	4.8	100
Hathras	41.0	59.0	4.9	34.1	48.8	12.2	0.0	100
Mirzapur	14.0	86.0	7.1	28.6	57.1	0.0	7.1	100
Amroha	14.0	86.0	0.0	50.0	42.9	7.1	0.0	100
Kannauj	34.0	66.0	0.0	35.3	52.9	11.8	0.0	100
Rampur	30.0	70.0	0.0	20.0	70.0	10.0	0.0	100
Total	24.7	75.3	2.7	38.3	50.5	7.2	1.4	900

Source: Primary Survey, 2019.

It was examined that 24.7 percent of sampled respondent revealed of giving their crops to lenders and selling their crops where various reasons were given by farmers for paying of their loan where most of the farmers said of payment after selling the crops i.e. 50.5 percent followed by way of Installments i.e. 38.3 percent. 2.7 percent reported of selling to same middlemen from whom they received the payment. 1.4 percent reported of paying off their loan by selling their animals.

VI: Loan Status:

Finance plays an important role in meeting the financial needs of the poor. Lack of savings and financial crisis forced them to take the loan or credit from various sources such as bank, relatives, institutions etc. in order to meet their needs. On this context, the table 5.26 explains the district wise classification of the status of growers who revealed of taking loan from different sources, where out of total sampled 55.7 percent accepted of taking loan for their needs to fulfill whereas 44.3 percent said of not taking any type of credit. The proportion of loan taken is higher in all districts.

Table 5.26: Sample farms reporting of Taking Loan or not (in percent):

District	YES	No	Total
Saharanpur	83.0	17.0	100
Gorakhpur	25.0	75.0	100
Sultanpur	43.0	57.0	100
Jalaun	57.0	43.0	100
Hathras	62.0	38.0	100
Mirzapur	41.0	59.0	100
Amroha	78.0	22.0	100
Kannauj	46.0	54.0	100
Rampur	66.0	34.0	100
Total	55.7	44.3	900

Source: Primary Survey, 2019.

Table 5.27: Purpose of Taking Loan:

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Agriculture	64.2	44.4	47.2	54.5	60.7	48.8	70.1	52.6	60	58.7
Horticulture	17.3	22.2	36.1	29.1	26.2	41.5	7.8	36.8	21.5	24.2
Marriage	6.2	11.1	0	7.3	4.9	2.4	10.4	0	10.8	6.4
Personal Needs	12.3	22.2	16.7	9.1	3.3	4.9	9.1	5.3	7.7	9.1
Education of children	0	0	0	0	3.3	0	1.3	5.3	0	1.1
Others	0	0	0	0	1.6	2.4	1.3	0	0	0.6
Total	100	100	100	100	100	100	100	100	100	100
Reporting	81	18	36	55	61	41	77	38	65	472

Source: Primary Survey, 2019.

Table 5.27 states about the purpose for which the growers revealed of taking loan where for agriculture purpose is the major reason explained by the farmers i.e. 58.7 percent and 24.2 percent reveals of taking loan for Horticulture purpose. Near about 9.0 percent said that they have taken loan for their personal needs and others needs. Hence, it reveals that major reason for taking loan is for farming purposes. Hence, government and other institute may come up with various suggestions in order to overcome the problem of finance in horticulture farming and to improve the condition of farmers.

VII: Insurance:

Insurance is a means of protection from risk and uncertainties involved in the life of an individual. It is a form of risk management primarily used to hedge against the risk of certain loss. Hence, in farmer's life, it is important to get insured the crops in order to provide security and protection against risk and uncertainty involved in their life. Table 5.28 revealed about the sample farms who reported of having insured of any type of crop under Horticulture farming where maximum 98.6 percent reported of not having any type of insurance for their crops. A small percentage of total farmers revealed of having insured their crops under Horticulture farming. This can be said that sample farms are far away from the financial source and are not getting any type of help from government and financial institution.

Table 5.28: Sample farm reporting of Insurance Any Crop under Horticulture Farming:

District	YES	NO	Total
Saharanpur	1.0	99.0	100
Gorakhpur	4.0	96.0	100
Sultanpur	0.0	100.0	100
Jalaun	1.0	99.0	100
Hathras	6.0	94.0	100
Mirzapur	1.0	99.0	100
Amroha	0.0	100.0	100
Kannauj	0.0	100.0	100
Rampur	0.0	100.0	100
Total	1.4	98.6	900

Source: Primary Survey, 2019.

It was seen that out of total sample size, only 1.4 percent that is 13 farmers revealed of having insurance for their crop under horticulture farming where 9 farmers revealed of getting insurance for their crops from financial source i.e. Bank and further 2 reported of getting insured from Krishi Sanstha Ikai. Only 1 farmer each reported of Reliance and Jila Adhanik

Kendra as source of getting insurance done. Crop insurance helps farmers to cover their risk in their life. Hence, proper measures and proper knowledge should be providing by financial institutions in order to promote the advantage of crop insurance.

Table 5.29: Name of Organization of Insurance:

District	Saharanpur	Gorakhpur	Jalaun	Hathras	Mirzapur	Total
Bank	1	1	1	6	0	9
Reliance	0	1	0	0	0	1
Jila Adhanik Kendra	0	1	0	0	0	1
Krishi Sanstha Ikai	0	1	0	0	1	2
Total	1	4	1	6	1	13

Source: Primary Survey, 2019.

It is important to analyze the amount for which the insurance is taken for different horticulture crops which is shown in the table 5.30 which reveals that maximum 4 farmers revealed of very low amount i.e. Rs. 9000. And 2 farmers revealed that they have taken insurance for their crop of Rs. 50000. Hence, it can be said that a very few farmers have taken insurance for their crop and that too of very low amount.

Table 5.30: Amount of Insured Crop taken by Sample Farms (in Rs.):

Amount	Saharanpur	Gorakhpur	Jalaun	Hathras	Mirzapur	Total
5500	0	1	0	0	0	1
6650	0	1	0	0	0	1
8000	0	0	0	1	0	1
9000	0	0	1	3	0	4
10940	0	1	0	1	0	2
11000	0	0	0	1	1	2
50000	1	1	0	0	0	2
Total	1	4	1	6	1	13

Source: Primary Survey, 2019.

Table 5.31: Did you take the insurance money ever and respondent reported of getting money:

	percent reported of taking insurance money		percent reported of getting the insurance amount		
District	**Yes**	**No**	**Yes**	**No**	**Total**
Saharanpur	1.0	99.0	1.0	99.0	100
Gorakhpur	3.0	97.0	1.0	99.0	100
Sultanpur	0.0	100.0	0.0	100.0	100
Jalaun	0.0	100.0	0.0	100.0	100
Hathras	5.0	90.0	1.0	99.0	100
Mirzapur	0.0	95.0	0.0	100.0	100
Amroha	0.0	100.0	0.0	100.0	100
Kannauj	0.0	100.0	0.0	100.0	100
Rampur	0.0	100.0	0.0	100.0	100
Total	1.0	96.9	0.3	99.7	900

Source: Primary Survey, 2019.

Table 5.31 explains about the sample farms who reported of importance of getting insurance done for their crops. Only 1 percent said 'yes' and it is surprisingly that 96.9 percent of farmers reported of not feeling comfortable in taking insurance. Further, only 0.3 percent reported of getting insurance money and 99.7 percent revealed about not getting any amount.

VIII: Knowledge and Re Allocation of the Horticulture Crops:

The major problem found in horticulture farming is lack of proper information and knowledge regarding the methods and techniques for planting various horticulture crops. It is important for farmers to have interaction regarding horticulture farming which will help them to acquire knowledge and skills as well as to share their ideas and experiences on their horticultural practices.

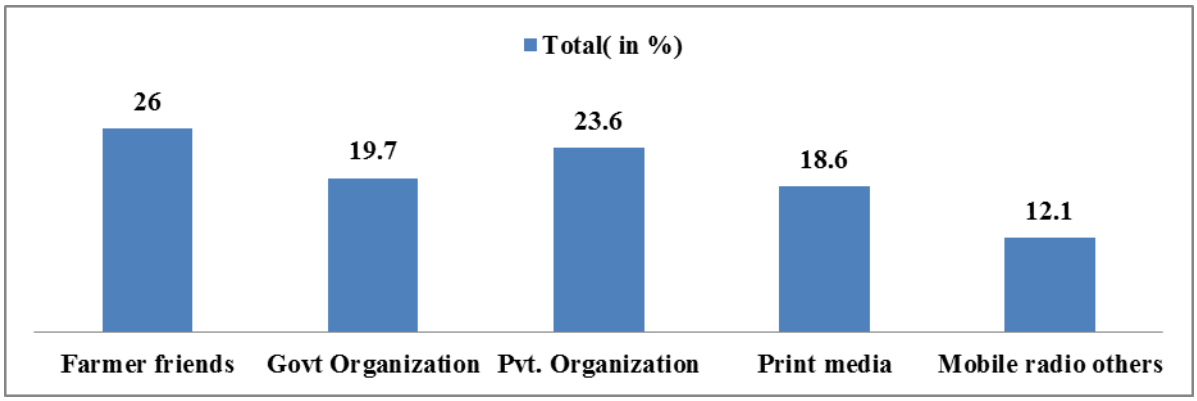
Hence, it is important to analyze the source from where the sampled respondent got information regarding horticulture farming which is explained in table 5.32. The table reflects that most of the farmers revealed of getting information through their farmers friend (26 percent), whereas 23.6 percent revealed of getting information through private organization and nearly about 20 percent through government organizations. Also, 18 percent revealed of getting information through print media such as newspaper and others. Thus, it can be said that most of the information is generated through Government and private organization so that farmer can resolve their issues or problems related to horticulture farming by obtaining information through interactions with Government officials, training and visits for better understanding and motivation.

Table 5.32: Source of Getting Information regarding Horticulture Farming (in percent):

District	Farmer friends	Govt. Organization	Pvt. Organization	Print media	Mobile radio others
Saharanpur	24.3	22.0	19.1	19.4	15.2
Gorakhpur	25.3	20.4	26.4	19.3	8.7
Sultanpur	24.4	20.4	23.9	18.8	12.6
Jalaun	28.5	21.0	24.2	17.9	8.4
Hathras	26.1	16.7	25.1	19.3	12.8
Mirzapur	28.9	21.8	20.9	16.5	11.8
Amroha	24.8	18.4	23.8	19.7	13.3
Kannauj	27.1	19.8	25.2	15.7	12.2
Rampur	25.5	17.0	23.7	20.6	13.1
Total	26.0	19.7	23.6	18.6	12.1

Source: Primary Survey, 2019.

Figure 5.8: Source of information regarding horticulture Farming (in percent)



Source: Primary Survey, 2019.

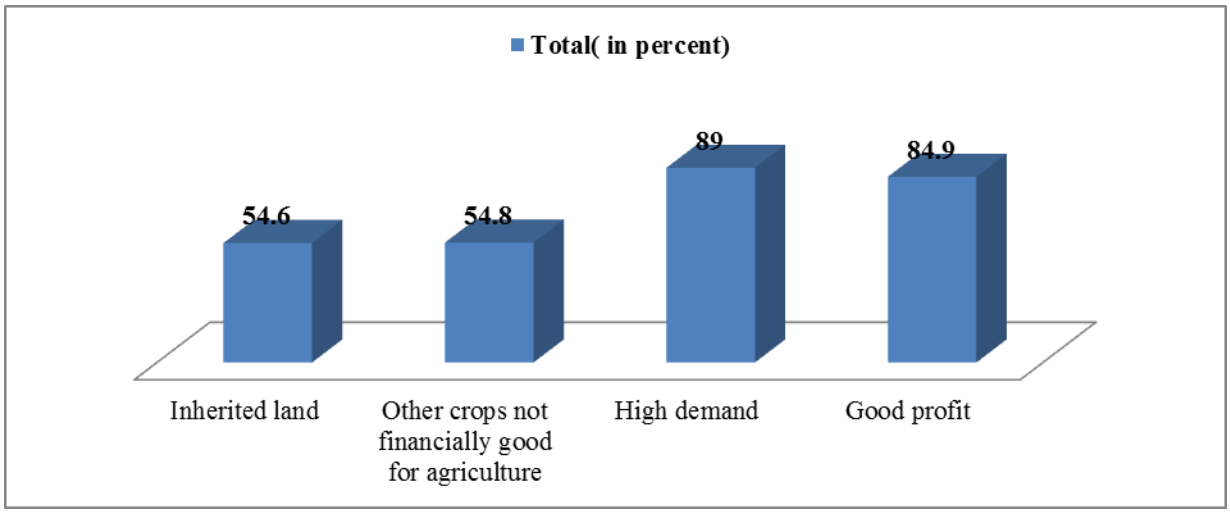
Table 5.33 shows the reason of inspiration for land use under horticulture farming which clearly explains that it is due to the high demand for horticulture crops as it was stated by 89 percent farmers. There were respondent (84.9 percent) who gave reasons of getting good profit by growing horticulture crops. Further, 54.8 percent revealed of saying that they used land for horticulture farming as other crops were not financially good for agriculture and 54.6 percent revealed of inheriting farms which were devoted to horticulture crops.

Table 5.33: Reasons of Inspiration for Land Use under Horticulture Farming:

District	Inherited land	Other crops not financially good for agriculture	High demand	Good profit
Saharanpur	78.0	38.0	66.0	76.0
Gorakhpur	55.0	50.0	92.0	81.0
Sultanpur	34.0	54.0	94.0	90.0
Jalaun	56.0	84.0	99.0	84.0
Hathras	51.0	62.0	100.0	100.0
Mirzapur	53.0	60.0	91.0	81.0
Amroha	55.0	32.0	77.0	73.0
Kannauj	52.0	63.0	100.0	98.0
Rampur	57.0	50.0	82.0	81.0
Total	54.6	54.8	89.0	84.9

Source: Primary Survey, 2019.

Figure 5.9: Reasons of Inspiration for Putting Land under Horticulture Farming



Source: Primary Survey, 2019.

Table 5.34 states the total number of sampled farms who ever re allocated cropping area for its horticulture production. It is clearly visible in the table that only 16.6 percent of total respondents reported of reallocating land for horticulture crops and 83.3 percent of sampled respondent completely denied of reallocation of cropping area for production. This reveals that a very low percent of the area of other crops is competitive for its horticultural production. The proportion of re-allocation was higher in Rampur (26 percent) followed by Saharanpur (25 percent). Further the table reveals about distribution of sample farms on basis of reallocation of cropping area for production on basis of different year which states that out of total area for re allocation i.e. 149 respondents (16.6 percent) re-allocated in recent year i.e. 2016- 2019 followed by 27.5 percent sample farmers reallocated for production in year 2010- 2015 and rest in the year between 1980 to 2009. District wise maximum number of sampled farms reallocated in Rampur district in the 2016-19 i.e. 26 percent followed by Saharanpur (25 percent) Jalaun (22 perecent) and Gorakhpur (21 percent). Hathras and Kannauj district found with very low number of total farmers who re-allocated in the recent year for production.

Table 5.34: Sample farms reported of ever Re-Allocation of cropping area for production

percent reported of reallocation of cropping area for horticulture crop's production			Year wise re-allocation of cropping area for production			
District	**YES**	**NO**	**1980 to 2009**	**2010 to 2015**	**2016 to 2019**	**No of HH**
Saharanpur	25.0	75.0	13 (52.0)	5 (20.0)	7 (28.0)	100
Gorakhpur	21.0	79.0	3 (14.3)	5 (23.8)	13 (61.9)	100

percent reported of reallocation of cropping area for horticulture crop's production			Year wise re-allocation of cropping area for production			
District	**YES**	**NO**	**1980 to 2009**	**2010 to 2015**	**2016 to 2019**	**No of HH**
Sultanpur	17.0	83.0	0 (0.0)	2 (11.8)	15 (88.2)	100
Jalaun	22.0	78.0	1 (4.5)	2 (9.1)	19 (86.4)	100
Hathras	8.0	92.0	0 (0.0)	5 (62.5)	3 (37.5)	100
Mirzapur	10.0	90.0	3 (30.0)	2 (20.0)	5 (50.0)	100
Amroha	13.0	87.0	2 (15.4)	9 (69.2)	2 (15.4)	100
Kannauj	7.0	93.0	0 (0.0)	3 (42.9)	4 (57.1)	100
Rampur	26.0	74.0	0 (0.0)	8 (30.8)	18 (69.2)	100
Total	**16.6**	**83.3**	22 (14.8)	41 (27.5)	86 (57.7)	**900**

Source: Primary Survey, 2019.

Further, the table 5.35 explains the reallocation of cropping area for production which is less (0.97 acre) in the recent year i.e. 2016-19 as compared to 2010-15 i.e. 1.39 acre. Overall, only 1.25 acre of area is re-allocated for production of horticulture crops. The proportion of re-allocation was highest for Saharanpur district and lowest for Kannauj district.

Table 5.35: Area wise Re-Allocation of Cropping Area for Production (Mean)

District	1980 to 2009	2010 to 2015	2016 to 2019	Total
Saharanpur	2.54	5.51	2.57	3.14
Gorakhpur	2.17	0.70	0.46	0.76
Sultanpur		0.75	0.50	0.53
Jalaun	1.00	1.00	0.95	0.95
Hathras		1.22	0.93	1.11
Mirzapur	1.50	0.45	1.74	1.41
Amroha	0.65	0.68	0.98	0.72
Kannauj		0.50	0.16	0.31
Rampur		0.97	1.09	1.06
Total	2.10	1.39	0.97	1.25

Source: Primary Survey, 2019.

Table 5.36 reveals about the problems and reasons for reallocation of horticulture crops where maximum respondents face problem of larger production in re allocation of new crops while 31.5 percent face problem of larger income and profit. 12.8 percent reveals of lack of investment problem. It was further seen that near about 10 percent of sample size reveals of expensive and shortage of labour. Many other problems and reasons were given by the respondent while re allocation of the horticulture crops for production which was explained

in table 3.6. This shows that overall, all the sampled district face problem by one or other way in re allocation of the horticulture crops.

Table 5.36: Type of Problem in Horticulture in Re-Allocation

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Lack of investment	24.0	4.8	11.8	9.1	0.0	20.0	23.1	0.0	11.5	12.8
Large income/profit	20.0	19.0	58.8	31.8	62.5	30.0	46.2	57.1	11.5	31.5
Less production	8.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	15.4	6.0
Shortage/expensive labour	16.0	4.8	5.9	4.5	12.5	10.0	0.0	0.0	19.2	9.4
Large production	16.0	14.3	17.6	27.3	25.0	10.0	0.0	28.6	30.8	19.5
High demand	4.0	4.8	0.0	9.1	0.0	10.0	0.0	0.0	3.8	4.0
low quality crops	4.0	4.8	0.0	0.0	0.0	10.0	7.7	0.0	3.8	3.4
Less loss	8.0	4.8	0.0	0.0	0.0	10.0	0.0	0.0	3.8	3.4
Farm was far from home	0.0	9.5	0.0	4.5	0.0	0.0	15.4	0.0	0.0	3.4
Poor quality soil	0.0	19.0	5.9	0.0	0.0	0.0	7.7	14.3	0.0	4.7
Motivated by other farmers	0.0	0.0	0.0	13.6	0.0	0.0	0.0	0.0	0.0	2.0
Total	100	100	100	100	100	100	100	100	100	100

Source: Primary Survey, 2019.

IX: Diversification of Crops:

The profitability of horticultural crops can be extended if diversification in crops is adopted. Diversification offers an attractive option and a major source of pushing up growth of agricultural sector. Technological up-gradation and institutional changes are identified as thrust areas for future development of the horticulture sector. Technology plays a major role in growth and development of all sectors of a nation. Hence, it is important to analyze the number of sample farms who planned to make changes to a species of a crop in coming years which is explained in Table 5.37 where 12.1 percent accepted of making changes to a species of a crop in coming years, while 87.9 percent reported of not planning to make any changes to a species of a crop in coming recent year.

Table 5.37: Sample farms reporting of planning to make changes to Species of a crop in coming years

District	YES	NO	Total
Saharanpur	15.0	85.0	100
Gorakhpur	10.0	90.0	100
Sultanpur	15.0	85.0	100
Jalaun	20.0	80.0	100
Hathras	4.0	96.0	100
Mirzapur	16.0	84.0	100
Amroha	8.0	92.0	100
Kannauj	11.0	89.0	100
Rampur	10.0	90.0	100
Total	12.1	87.9	900

Source: Primary Survey, 2019.

Out of total sample size, only 109 farmers revealed of making changes to a species in crop where 20 farmers in Jalaun district stated about crop diversification mainly in Fruits. Further, Mirzapur, Sultanpur and Saharanpur district, farmer reveals of making changes in the species of crops mainly in Fruits and vegetables. Only 1 respondent out of total reported of making changes in Spices. This state that they want crop diversification under different horticulture crops so as to improve the quality and variety in crops.

Table 5.38: Name of crops for Diversification under Horticulture Farming:

District	Foodgrains	Fruits	Vegetables	Spices	Flowers	Cash Crops	Other Crops	Total
Saharanpur	0	12	2	0	0	1	0	15
Gorakhpur	0	3	7	0	0	0	0	10
Sultanpur	0	8	4	0	2	1	0	15
Jalaun	0	8	5	0	4	3	0	20
Hathras	0	3	0	1	0	0	0	4
Mirzapur	0	11	0	0	4	1	0	16
Amroha	0	4	2	0	1	1	0	8
Kannauj	0	1	2	0	6	1	1	11
Rampur	0	1	9	0	0	0	0	10
Total	0	51	31	1	17	8	1	109

Source: Primary Survey, 2019.

Reasons given by the farmers for adoption of crop diversification is explained in table 5.39 where maximum farmer i.e. 41.3 percent revealed of higher profit earned by making changes in species of crops. 27.5 percent farmer also suggested of extra consumption due to which crop diversification is done which is beneficial to them. 11.9 percent also stated about receiving good and reasonable amount by diversification of crops. Near about 4 percent also revealed about high demand of diversified produce in various horticulture crops. Farmer also reported of having fewer diseases in the crops while making changes in the species of crops

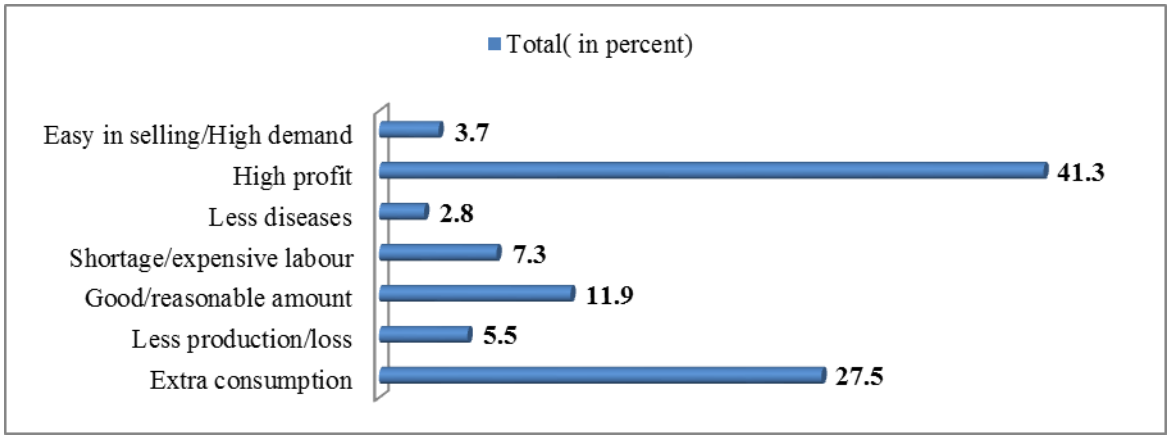
of horticulture farming. Hence, it can be said that with the help of crop diversification it can be economically beneficial to the farmers.

Table 5.39: Reasons given by the growers for Diversification of Crops:

District	Extra consumption	Less production/loss	Good/reasonable amount	Shortage/expensive labour	Less diseases	High profit	Easy in selling/ High demand	Total	Reporting
Saharanpur	31.3	18.8	6.3	12.5	6.3	18.8	6.3	100.0	16
Gorakhpur	40.0	0.0	10.0	10.0	0.0	40.0	0.0	100.0	10
Sultanpur	33.3	6.7	6.7	0.0	0.0	53.3	0.0	100.0	15
Jalaun	21.1	0.0	15.8	10.5	0.0	47.4	5.3	100.0	19
Hathras	25.0	0.0	75.0	0.0	0.0	0.0	0.0	100.0	4
Mirzapur	12.5	12.5	6.3	6.3	12.5	50.0	0.0	100.0	16
Amroha	50.0	0.0	0.0	0.0	0.0	50.0	0.0	100.0	8
Kannauj	27.3	0.0	27.3	9.1	0.0	27.3	9.1	100.0	11
Rampur	20.0	0.0	0.0	10.0	0.0	60.0	10.0	100.0	10
Total	27.5	5.5	11.9	7.3	2.8	41.3	3.7	100.0	109

Source: Primary Survey, 2019.

Figure 5.10: Reasons given by Farmers for Diversification of Crops:



X: Knowledge about various pesticides:

It is important to have proper knowledge and proper information about the procedure of cultivation of horticulture crops where growers of different crops must have knowledge about the use of pesticides and other things so as not to hamper the productivity of horticulture crops. Due, to lack of knowledge and inappropriate information of the farming technique, the plant might not get spoiled in view of lack of knowledge about procedure required for planting horticulture crops. Therefore, it is very pertinent to generate awareness for the growers to take adequate information/ care and proper insight about the method and techniques for planting of horticulture crops. The selected districts were using pesticides

which were restricted and might be harmful to the crops as well as to the health of the farmers. Farmers retorted that use of such pesticides can hamper the productivity as well.

In this context our team enquired about the usage of pesticides by the horticulture crops' growers and the responses are tabulated in Table 5.40. The table reveals about the sample size who reported of having knowledge about the restricted pesticides and maximum i.e. 56.3 percent of respondents accepted of having information regarding restricted pesticides and about 43 percent denied having any knowledge about restricted pesticides which may be harmful to their crops. Further, the table reveals about the source from where the farmers are getting information regarding the pesticides and it was found that 4.5 percent of total farmers are getting information through big farmers and 26 percent revealed of getting knowledge about restricted pesticides from traders. Government agencies also play a very important role in providing information about the use of pesticides as 15.8 percent of farmer revealed of getting information through such agencies and 4.5 percent revealed of getting information through media.

Table 5.40: Sample size Reported of having Knowledge about the Restricted Pesticides:

Knowledge about restricted pesticides			Source of getting information about restricted pesticides					
District	**YES**	**NO**	**From government agency**	**From exporters**	**From traders**	**From big farmers**	**Through media**	**Total**
Saharanpur	71.0	29.0	38.7	10.1	18.5	27.7	5.0	100
Gorakhpur	43.0	57.0	16.4	3.3	31.1	47.5	1.6	100
Sultanpur	51.0	49.0	8.3	10.7	29.8	47.6	3.6	100
Jalaun	69.0	31.0	11.4	1.0	28.6	56.2	2.9	100
Hathras	78.0	22.0	7.5	4.1	28.6	52.4	7.5	100
Mirzapur	44.0	56.0	26.4	11.1	11.1	41.7	9.7	100
Amroha	44.0	56.0	28.4	9.0	20.9	38.8	3.0	100
Kannauj	62.0	38.0	4.7	2.8	36.8	53.8	1.9	100
Rampur	45.0	55.0	3.9	16.9	24.7	50.6	3.9	100
Total	56.3	43.7	15.8	7.2	26.0	46.5	4.5	900

Source: Primary Survey, 2019.

Table 5.41 collated informationabout respondents who reported of using the restricted pesticides despite being aware about its harmful effect. About 26.9 percent of total sampled respondents reported of using pesticides while 73.1 percent denied bluntaly about its usage. This state of affair relates to the situation that inspite of being aware about the harmful effect of restricted pesticides, most of the farmers were using for their crops due to various reasons given by them which is explained further in Table 5.42.

Table 5.41: Sample size reported of using restricted Pesticides despite the knowledge:

District	YES	NO	Total
Saharanpur	25.0	75.0	100
Gorakhpur	37.0	63.0	100
Sultanpur	39.0	61.0	100
Jalaun	22.0	78.0	100
Hathras	23.0	77.0	100
Mirzapur	21.0	79.0	100
Amroha	20.0	80.0	100
Kannauj	17.0	83.0	100
Rampur	38.0	62.0	100
Total	26.9	73.1	900

Source: Primary Survey, 2019.

There are various reasons given by the farmers in order consolidate the information extended by our respondents regarding using the restricted pesticides. We find that 31.8 percent respondents revealed of using these restricted pesticides for the safety of the crops, and 27.3 percent said that they used it in order to prevent the crops from the diseases. It is surprising to find that in order to have larger production and to earn higher profits, 24.8 percent revealed of using the restricted pesticides for their crops. Only 13.2 percent stated of using it for healthy crops and growth of good crops.

Table 5.42: Type of Reasons given by the Growers for using restricted Pesticides:

District	Safety of crops	Large production	Crop's growth	Protection from animals	Good/healthy crops	Prevent from diseases	Total	Reporting
Saharanpur	52.0	24.0	8.0	4.0	8.0	4.0	100.0	25
Gorakhpur	2.7	24.3	0.0	0.0	29.7	43.2	100.0	37
Sultanpur	33.3	15.4	0.0	0.0	30.8	20.5	100.0	39
Jalaun	9.1	36.4	4.5	0.0	0.0	50.0	100.0	22
Hathras	52.2	30.4	0.0	0.0	13.0	4.3	100.0	23
Mirzapur	47.6	9.5	9.5	0.0	9.5	23.8	100.0	21
Amroha	15.0	35.0	5.0	0.0	5.0	40.0	100.0	20
Kannauj	76.5	17.6	0.0	0.0	0.0	5.9	100.0	17
Rampur	26.3	31.6	0.0	0.0	2.6	39.5	100.0	38
Total	31.8	24.8	2.5	0.4	13.2	27.3	100.0	242

Source: Primary Survey, 2019.

XI: Training related to Horticulture Crop:

In order to improve the production of various horticulture crops, proper training must be provided to the farmers. Table 5.43 explains about the sample farmers who reported of

getting any kind of training for good crop yield and 24.6 percent of respondents accepted of getting training in cultivation of horticulture crops and on the other hand 75.4 percent reported of not getting any type of training from any source for the production of good crop. This revealed that very low percentage of total sampled districts ontained any training for good crop yield. Hence, efforts should be taken in order to provide proper training to farmers who willingly opt for horticulture crops growing in the State.

Table 5.43: Sampled Farmers reported of getting Training for good Crop Yield

District	YES	NO	Total
Saharanpur	8.0	92.0	100
Gorakhpur	18.0	82.0	100
Sultanpur	18.0	82.0	100
Jalaun	53.0	47.0	100
Hathras	26.0	74.0	100
Mirzapur	36.0	64.0	100
Amroha	10.0	90.0	100
Kannauj	28.0	72.0	100
Rampur	24.0	76.0	100
Total	24.6	75.4	900

Source: Primary Survey, 2019.

Table 5.44 states about the training provided to the sample farmers where, out of total sampled farmers, 224 reported of getting training and where 25.9 percent revealed of getting trained through Kisaan mela, 17 percent received it by Days training. Horticulture department also play an important role in providing training to the farmers. There are other organization which also helps in providing training to the farmers such as PM Krishi Sichai Yojana, PM kisaan Yojana and others. It was found that many other institutions also came up in order to provide training to the farmers regarding restricted use of pesticides, providing training regarding increasing production, irrigation etc which may be helpful to farmers.

Table 5.44: Name of Training given

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Horticulture department	22.2	33.3	11.1	7.5	7.7	18.9	12.5	3.6	4.2	12.1
Vegetable production	44.4	9.5	0.0	7.5	7.7	5.4	0.0	0.0	8.3	7.1
Pesticide	11.1	0.0	5.6	1.9	0.0	2.7	0.0	0.0	4.2	2.2
PM kisaan yojna	11.1	4.8	0.0	1.9	0.0	21.6	0.0	0.0	25.0	7.6
Days training	0.0	47.6	5.6	45.3	0.0	0.0	0.0	10.7	0.0	17.0

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Kisaan mela	11.1	4.8	11.1	9.4	84.6	8.1	62.5	46.4	25.0	25.9
Kisaan training	0.0	0.0	22.2	17.0	0.0	2.7	12.5	0.0	4.2	7.1
Kisaan goshti	0.0	0.0	38.9	1.9	0.0	0.0	0.0	10.7	29.2	8.0
PM Krashi Sichai Yojna	0.0	0.0	5.6	3.8	0.0	40.5	12.5	21.4	0.0	11.2
Phool vistaar	0.0	0.0	0.0	3.8	0.0	0.0	0.0	7.1	0.0	1.8
Total	100	100	100	100	100	100	100	100	100	100
Reporting	9	21	18	53	26	37	8	28	24	224

Source: Primary Survey, 2019.

Table 5.45: Name of the Trainer:

District	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Officials	22.2	28.6	11.1	26.4	26.9	59.5	12.5	50.0	70.8	37.9
Government	44.4	4.8	5.6	0.0	19.2	0.0	0.0	0.0	0.0	4.9
Jila Adhinayak Kendra	0.0	23.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Block Basti	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Horticulture department	33.3	9.5	72.2	69.8	53.8	40.5	87.5	42.9	4.2	46.4
Krashi Vigyaan Kendra	0.0	0.0	5.6	1.9	0.0	0.0	0.0	3.6	25.0	4.0
Krashi Suraksha Unit	0.0	0.0	5.6	1.9	0.0	0.0	0.0	3.6	0.0	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Reporting	9	21	18	53	26	37	8	28	24	224

Source: Primary Survey, 2019.

Table 5.45 reflects upon the trainers who provided training to the farmers and nearly half of the farmers of our sample i.e. 46.4 percent accepted of getting trained through Horticulture department and further by officials. Government also played a role in providing training to about 5 percent of the sampled farmers. Further, it was found that training is provided through Jila Adhinak Kendra, Block basti, Krishi Vigyaan Kendra and others.

Explanation in table 5.46 reveals about the duration of training given where 51.7 percent respondents revealed of getting training for one day. Only 0.9 percent of farmers reported of training for a period of eight days pertaining growing of good crop and enhancing yield.

Hence, it can be said that government and other financial and training institutes must be encouraged so as to develop horticulture farming and improve the condition of the growers.

Table 5.46: Duration of Training Given:

Duration	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
One Day	16.7	4.8	88.9	29.6	50.0	62.2	75.0	78.6	65.2	51.1
Two Days	0.0	14.3	5.6	40.7	42.3	24.3	25.0	17.9	30.4	27.1
Three Days	50.0	42.9	5.6	29.6	3.8	13.5	0.0	3.6	0.0	16.3
Hour Days	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Five Days	16.7	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
Seven Days	0.0	14.3	0.0	0.0	3.8	0.0	0.0	0.0	0.0	1.8
Eight Days	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total	6	21	18	54	26	37	8	28	23	221

Source: Primary Survey, 2019.

XII: Access and Awareness of Government Schemes:

Knowledge or awareness about the government schemes related to horticulture farming is showed in Table 5.47. It was found that maximum respondents i.e.76.3 percent have knowledge about the schemes and only 23.7 percent of the total respondents revealed of not having any type of awareness about the schemes related to horticulture cop growing. This can be taken as a positive impact on the life of farmers as they have access and awareness about the financial schemes related to their field of operation which may be beneficial to them.

Table 5.47: Do you have knowledge about the Govt. Schemes under Horticulture Farming:

District	YES	NO	Total
Saharanpur	31.0	69.0	100
Gorakhpur	85.0	15.0	100
Sultanpur	83.0	17.0	100
Jalaun	83.0	17.0	100
Hathras	86.0	14.0	100
Mirzapur	87.0	13.0	100
Amroha	83.0	17.0	100
Kannauj	84.0	16.0	100
Rampur	65.0	35.0	100
Total	76.3	23.7	900

Source: Primary Survey, 2019.

Explanation in below table stated about having knowledge about the different schemes related to horticulture farming. 75.4 percent of overall farmers reported of having awareness about different schemes mainly Kisaan Samaan Yojana in all selected districts. 11.0 percent

revealed of having information about K.K.C. Further, many other schemes were explained by the sampled farmers which reported of having information about the schemes related to their area of operations namely, PM Kisaan Yojana, crop insurance and others.

Table 5.48: Knowledge about Name of Schemes

Schemes	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
PM Kisaan Yojna	19.4	3.5	0.0	0.0	2.3	0.0	0.0	0.0	0.0	1.6
Kisaan samaan yojna	51.6	92.9	94.0	43.4	57.0	70.1	98.8	65.5	95.4	75.4
Krashak Vrakshya Dhan yojna	16.1	0.0	0.0	0.0	1.2	0.0	0.0	0.0	1.5	1.0
Beekeeping	3.2	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.3
Fisheries	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Establishing news farms for many years	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Flower farm extension	0.0	0.0	0.0	10.8	1.2	4.6	0.0	6.0	0.0	2.8
Spice farming extension	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.1
Replace old trees with new ones	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Boond-boond sichai jojna	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Ultra high-tech city	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
K.K.C.	0.0	0.0	3.6	30.1	19.8	18.4	0.0	23.8	0.0	11.8
Crop insurance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.1
drip sichai yojna	0.0	1.2	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.4
Ujjwala yojna	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.1
Drump vidhi yojna	0.0	0.0	0.0	0.0	1.2	1.1	0.0	0.0	0.0	0.3
Horticulture mechanisation karya kram	0.0	0.0	0.0	0.0	4.7	2.3	0.0	0.0	0.0	0.9
Cold storage	0.0	0.0	0.0	1.2	1.2	0.0	0.0	0.0	1.5	0.4
Atma yojna	0.0	1.2	0.0	1.2	0.0	0.0	1.2	0.0	0.0	0.4
Mushroom production yojna	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.1
Horticulture extension yojna	0.0	0.0	0.0	2.4	2.3	0.0	0.0	0.0	0.0	0.6
PM kisaan sichai yojna	0.0	0.0	0.0	3.6	9.3	1.1	0.0	3.6	0.0	2.2
Shak bhaji vistaar yojna	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.**
Reporting	**31**	**85**	**83**	**83**	**86**	**87**	**83**	**84**	**65**	**687**

Source: Primary Survey, 2019.

Table 5.49 revealed about the type of help received by the horticulture department for farming operations in the form of training, seeds, soil, irrigation and plantation, and maximum 25.25 percent of respondents i.e. 103 in number reported of getting help in form of seeds. Further 77 respondents reported of getting help in form of soil and farmers also accepted of getting support from department in form of training and plantation. Hence, in this context it can be said that by one or other way most of the respondents in the selected districts received help from various departments for horticulture farming which could be beneficial to them.

Table 5.49: Type of Help Received by Horticulture Department for Farming:

District	Training	Seeds	Soil	others	Irrigation	Plantation	Total
Saharanpur	2.7	0.0	0.0	0.0	0.0	0.0	0.5
Gorakhpur	16.2	21.4	24.7	24.7	8.3	0.0	18.1
Sultanpur	13.5	34.0	41.6	41.6	4.2	9.4	28.2
Jalaun	44.6	17.5	6.5	6.5	33.3	47.2	23.0
Hathras	13.5	1.0	1.3	1.3	0.0	1.9	3.4
Mirzapur	2.7	13.6	13.0	13.0	41.7	11.3	12.7
Amroha	0.0	4.9	3.9	3.9	0.0	0.0	2.7
Kannauj	6.8	5.8	7.8	7.8	12.5	20.8	9.1
Rampur	1.4	1.9	1.3	1.3	0.0	9.4	2.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Reporting	**74**	**103**	**77**	**77**	**24**	**53**	**408**

Source: Primary Survey, 2019.

XIII: Organization Details:

It was important to enquire the respondents of the selected districts as to whether they were the member of any organization or not and it was found that out of total sample, 94.1 percent revealed of being a member of organization whereas only 5.9 percent denied of not being a member of any organization under horticulture farming. This shows that maximum respondents depend upon financial sources.

The explanation in table 5.50 revealed about the organizations to which these respondents were affiliated. 88.2 percent stated that they were mainly member of Co-operative society mainly in in Jalaun, Sultanpur, Mirzapur, Amroha and Rampur districts. Some 5.9 percent said that they were member of farmer's cooperative service committee. Only 2 percent were member of Sugarcane society. In Saharanpur district 89 percent reported to be memberof some organization or the other. 20 percent respondents from Gorakhpur district were member of Mango krishi Association

Table 5.50: Are you a Member for any Organization:

	percent reporting of having member for any Organization		Name of Organization					
District	**YES**	**No**	**Co-operative society**	**Farmers co-operative service committee**	**Sugarcane society**	**Mango pack house**	**Mango krishi association**	**Total**
Saharanpur	89.0	11.0	72.7	9.1	9.1	9.1	0.0	100
Gorakhpur	94.0	6.0	80.0	0.0	0.0	0.0	20.0	100
Sultanpur	98.0	2.0	100.0	0.0	0.0	0.0	0.0	100
Jalaun	83.0	17.0	100.0	0.0	0.0	0.0	0.0	100
Hathras	96.0	4.0	75.0	25.0	0.0	0.0	0.0	100
Mirzapur	97.0	3.0	100.0	0.0	0.0	0.0	0.0	100
Amroha	97.0	3.0	100.0	0.0	0.0	0.0	0.0	100
Kannauj	98.0	2.0	50.0	50.0	0.0	0.0	0.0	100
Rampur	95.0	5.0	100.0	0.0	0.0	0.0	0.0	100
Total	94.1	5.9	88.2	5.9	2.0	2.0	2.0	900

Source: Primary Survey, 2019.

Table 5.51 states about the profit received from organizations and it can be seen clearly that 78.4 percent of the growers received profit regarding seeds and fertilizers and 9.8 percent received in terms of machinery. Nearly about 4 percent profit is also to be found regarding loan, in packaging, and in marketing.

Table 5.51: Type of Facility/ Profit Received from Organization

District	Loan	Seeds/Fertilizer	Help in packing	Marketing	Machinery	Total
Saharanpur	9.1	45.5	18.2	18.2	9.1	100.0
Gorakhpur	0.0	80.0	0.0	0.0	20.0	100.0
Sultanpur	0.0	100.0	0.0	0.0	0.0	100.0
Jalaun	0.0	100.0	0.0	0.0	0.0	100.0
Hathras	0.0	50.0	0.0	0.0	50.0	100.0
Mirzapur	0.0	100.0	0.0	0.0	0.0	100.0
Amroha	0.0	66.7	0.0	0.0	33.3	100.0
Kannauj	0.0	100.0	0.0	0.0	0.0	100.0
Rampur	20.0	80.0	0.0	0.0	0.0	100.0
Total	3.9	78.4	3.9	3.9	9.8	100.0

Source: Primary Survey, 2019.

XIV: Knowledge related about Geographical Situations:

Geographical indications have emerged as one of the important rights in order to provide protection of certain products which are in geographical specific area. In order to double the farmers income, geographical indication has played an important role in providing protection to number of fruits, vegetables, spices and flower varieties which have been registered. Hence, it is important to know that our sampled farmers have knowledge about geographical situations which are related to horticulture farming and scenario is reflected in table 5.52 stating that 65.6 percent of the total sample don't have any type of knowledge about this whereas 34.4 percent revealed of having knowledge which is better sign from farmers point of view.

Most of the farmers accepted of having knowledge about the geographical situation related to horticulture farming and 35 percent accepted of having knowledge about Seasonal Farming followed by 17.8 percent accepted that due to uncertainty in weather conditions crops gets destroyed and 16.8 percent accepted of having knowledge about wind direction and knowledge about soil. This situation of having knowledge about the geographical conditions may be regarded as a positive indicator which helps the farmers in getting higher productivity and there by higher profit.

Table 5.52: Do you have any knowledge about geographical situations related to horticulture farming?

knowledge about geographical situations related to horticulture farming			If yes, What kind of Knowledge						
District	**YES**	**NO**	**Rain**	**Seasonal Farming**	**Crops get destroyed due to uncertain weather**	**Crop related**	**Wind direction**	**Production**	**soil**
Saharanpur	13.0	87.0	15.4	7.7	46.2	7.7	23.1	0.0	0.0
Gorakhpur	38.0	62.0	13.2	26.3	13.2	0.0	23.7	2.6	21.1
Sultanpur	56.0	44.0	12.5	28.6	8.9	0.0	14.3	1.8	33.9
Jalaun	38.0	62.0	2.6	44.7	18.4	0.0	18.4	0.0	15.8
Hathras	48.5	51.5	29.2	29.2	10.4	2.1	8.3	0.0	20.8
Mirzapur	43.0	57.0	16.3	53.5	7.0	0.0	16.3	0.0	7.0
Amroha	13.0	87.0	0.0	23.1	0.0	0.0	53.8	0.0	23.1
Kannauj	43.0	57.0	2.3	48.8	32.6	0.0	11.6	2.3	2.3
Rampur	17.0	83.0	11.8	17.6	58.8	0.0	11.8	0.0	0.0
Total	34.4	65.6	12.6	35.0	17.8	0.6	16.8	1.0	16.2

Source: Primary Survey, 2019.

Sampled districts were asked about having knowledge about registered horticulture farming types under Geographical Indications and it was surprisingly found that most of the farmers i.e. 91.8 revealed of not having any knowledge regarding the same and only 8.2 percent revealed of having knowledge. Hence, such a scenario call for the initiative by the Government to provide proper information to improve growers' conditions engaged in horticulture farming.

Table 5.53: Do you have any knowledge about registered horticulture farming types under geographical indicators (G.I.):

	percent reported of having Knowledge about registration of horticulture farming under G.I		Have you benefited under G.I		
District	**Yes**	**No**	**Yes**	**No**	**Total**
Saharanpur	13.0	87.0	0.0	100.0	100
Gorakhpur	9.0	91.0	2.0	98.0	100
Sultanpur	8.0	92.0	0.0	100.0	100
Jalaun	11.0	89.0	3.0	97.0	100
Hathras	6.0	94.0	1.0	99.0	100
Mirzapur	10.0	90.0	0.0	100.0	100
Amroha	4.0	96.0	0.0	100.0	100
Kannauj	5.0	95.0	1.0	99.0	100
Rampur	8.0	92.0	1.0	99.0	100
Total	8.2	91.8	0.9	99.1	900

Source: Primary Survey, 2019.

Further, it was found that only 8.2 percent of the sampled farmers were registered under Geographical Indications and only 0.9 percent are found to be benefited under GI scheme - where only 2 percent in Gorakhpur district, 3 percent in Jalaun district and 1 percent each out of total in Hathras, Kannauj and Rampur districts accepted of benefiting under geographical indications. Hence, it is important to provide them proper information regarding benefits by registering their crops under geographical indications.

XV: Expectation/ Help from Government:

In Table 5.54 shows that the expectation of the growers of various horticulture crops from the government in selected districts where the maximum growers i.e. 23.8 percent want help related to water and irrigation facility and 16.1 percent revealed of wanting help in terms of subsidy from government. Many growers reported of getting their crops damaged by wild animals hence, 8.6 percent of growers wanted help in seeking protection from wild animals. Farming tools also play an important role in farming activity and it was found that most of the farmers in selected district don't have proper tools for production and cultivation of crops

which adversely affect the farming activity hence, it was found that most of the farmers revealed of wanting discount on farming tools. Many other expectations were also reported by farmers/ growers, who wanted to be fulfilled by government which may be related to transportation facility, marketing facility, training provided by them, pesticides facility and others. Hence, it can be said that government should take proper efforts in order to cover up the problems faced by the growers in the cultivation of various horticulture crops.

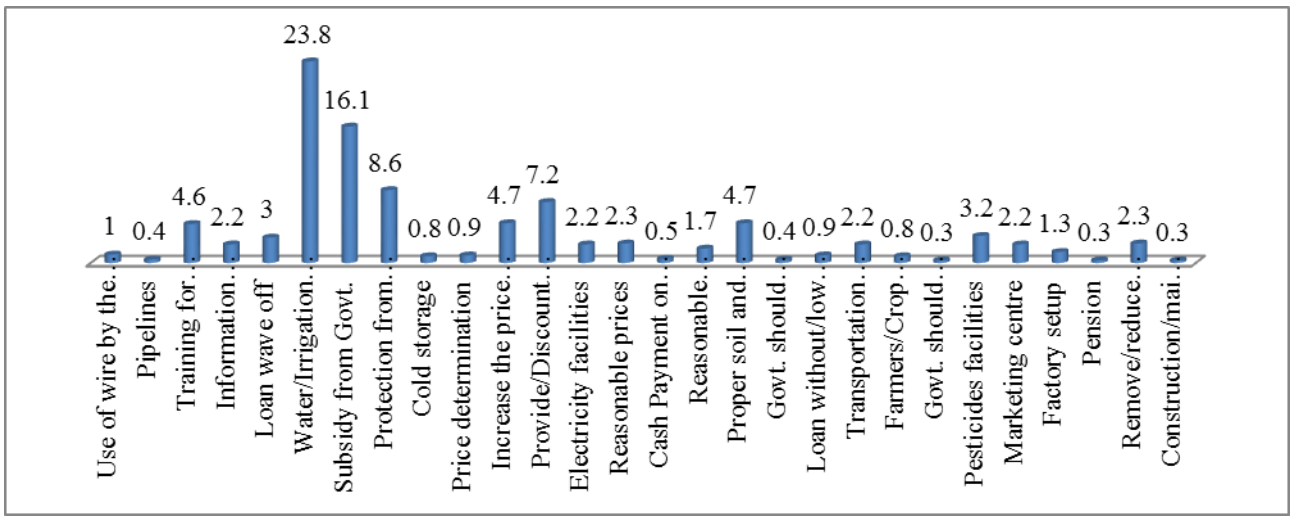
Table 5.54: Help expected from Govt. related to Production/Export under Horticulture Farming:

	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Use of wire by the govt.	2.6	0.5	0.4	0.0	5.5	0.0	0.0	0.0	0.0	1.0
Pipelines	1.7	0.0	0.0	0.0	0.0	0.7	0.0	1.4	0.0	0.4
Training for farming techniques	4.4	2.7	5.3	5.0	3.4	3.5	6.3	3.2	7.9	4.6
Information regarding types and species and Govt. schemes	0.0	1.4	0.8	0.8	5.5	0.7	2.6	4.2	3.2	2.2
Loan wave off	8.7	0.0	1.5	3.1	3.4	0.4	8.8	0.4	0.8	3.0
Water/Irrigation facilities	18.8	27.1	24.5	23.8	22.6	27.5	26.8	17.9	25.7	23.8
Subsidy from Govt.	6.1	18.6	17.0	8.4	10.6	24.6	12.5	24.6	20.9	16.1
Protection from wild animals	3.1	4.1	6.4	15.3	17.5	16.9	2.2	6.0	2.8	8.6
Cold storage	2.2	0.9	0.8	1.1	0.3	1.1	1.1	0.0	0.0	0.8
Price determination	3.1	0.9	0.8	0.4	0.3	0.0	1.8	0.4	0.8	0.9
Increase the price of crops	4.4	2.7	1.9	1.9	0.3	4.6	4.8	14.7	6.3	4.7
Provide/Discount on farming tools	4.4	15.8	13.2	10.3	3.4	3.2	9.2	3.5	3.2	7.2
Electricity facilities	7.4	3.2	1.9	0.4	0.0	0.7	5.9	1.8	0.0	2.2
Reasonable prices	6.1	0.5	2.6	0.4	9.6	0.0	0.0	1.1	0.0	2.3
Cash Payment on time	2.6	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.5
Reasonable compensation for damaged crops	3.9	1.8	2.6	0.0	0.3	0.0	2.6	0.7	4.3	1.7
Proper soil and seeds arrangements by the Govt.	1.3	5.9	6.8	13.8	2.7	4.6	2.9	1.1	3.2	4.7
Govt. should purchase crops	1.7	0.0	0.4	0.4	0.0	0.0	0.0	0.7	0.8	0.4
Loan without/low interest	1.7	1.8	0.4	0.4	0.0	0.4	1.5	0.0	2.4	0.9

	Saharanpur	Gorakhpur	Sultanpur	Jalaun	Hathras	Mirzapur	Amroha	Kannauj	Rampur	Total
Transportation facility	3.1	2.7	3.8	1.1	1.0	1.8	1.5	3.2	2.0	2.2
Farmers/Crop insurance	2.2	0.0	1.1	0.0	0.0	0.0	0.0	1.8	2.4	0.8
Govt. should facilitate packing and export of crops	2.2	0.5	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.3
Pesticides facilities	5.7	2.7	1.9	2.7	8.6	1.4	1.5	0.7	3.6	3.2
Marketing centre	0.4	1.4	1.5	3.8	0.0	3.9	0.0	2.8	5.5	2.2
Factory setup	0.9	0.0	0.0	0.0	2.1	0.0	0.0	7.7	0.4	1.3
Pension	0.0	0.5	0.0	0.0	1.4	0.0	1.1	0.0	0.0	0.3
Remove/reduce middlemen's cost	0.4	0.0	1.9	5.0	0.0	3.5	4.0	1.8	4.0	2.3
Construction/maintenance of roads	0.0	0.0	0.0	1.5	1.0	0.0	0.4	0.0	0.0	0.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Reporting	**229**	**221**	**265**	**261**	**292**	**284**	**272**	**285**	**253**	**2362**

Source: Primary survey, 2019.

Figure 5.11: Help expected from Government by the Farms



Source: Primary Survey, 2019.

XVI: Conclusion:

The horticulture sector is known worldwide and has a very vital significance in the economic development for the State of Uttar Pradesh. Apart from the fact that the farmers can grow in this sector with small investments and has the potential to provide large employment opportunity in various sectors of horticulture farming and there by penetrate the international

market. Beside this, the farming sector and growers involved in this activity are facing severe problems which were analyzed in the chapter.

The chapter contains the important findings of the study which explains about the problems of the growers engaged in the horticulture farming. The study presents the factors and problems leading to its decline. At the very outset, the chapter highlights the issue that horticulture farming is not a pleasant work for these growers as most of the respondent sells their orchards to traders and that too unwillingly and maximum respondents are selling their orchards before getting flowers by receiving half amount. As most of the respondent revealed of delayed payment as the major reason for their distress. Growers also proclaimed of having a deal between themselves and the traders. The chapter further highlights that most of the growers have taken loan for the growing of the crops and in order to pay off the loan amount, they faced many problems as they had to pay installments and sometimes also have to sell their animals to meet their liability.

Further, the chapter concludes that most of the farmer gets information about the horticulture farming from farmer's friend and very low percent of the area of the other crops is found to be competitive for its horticulture production. Problem in reallocation of the various horticulture crops are faced by the growers. The selling and market related challenges are the main problem in improving the economic status of horticulture producers. The growers of the crops basically find it very difficult to sell off their produce to the ultimate customers. 88.8 percent of farmers were found to face problem in selling their crops. Various competitions are faced by the growers in relation to its variety, price and its quality. Very few farmers revealed of receiving compensation for the loss of their crops from any government institution. Only 1.4 percent growers found to have insured their crops and to have benefitted in wake of any crop loss .

Technological up-gradation and institutional changes are identified as thrust areas for future development of the horticulture sector. 41.3 percent growers wanted to diversify the crops in order to have higher profit. Further, the chapter highlights that despite of having information about restricted pesticides most of the farmers revealed of using it for the safety of their crops and to earn higher production and profit. Training may also help the growers to improve their economic conditions. In the study it can be concluded that very low percentage of the growers were trained by various organizations. Hence, Government and other financial and training institutions must be encouraged to develop horticulture farming and improve the

condition of the growers. Major reason for taking loans is for farming purposes. Hence, government and other institute may come up with various suggestions in order to overcome the problem of finance in horticulture farming and to improve the condition of farmers. Further the study concludes that almost all the sampled farmerss were not registered under Geographical Indications i.e. 99.1 percent. Hence, it is important to provide them proper information regarding benefits by registering their crops under geographical indications. At the end farmers revealed of having their expectation from the government in order to overcome the problems faced by them where the major problem faced by them was due to lack of irrigation facility. The analysis shows that in spite of their strategic importance in terms of employment creation, the horticulture sector in selected districts play an important role since this sector is facing severe problem from many many angle and needs various strategies, suggestions and intervention to improve the quality of life of growers in the sector.

Chapter 6

Findings and Policy Prescription

I: Introduction:

Indian agriculture has been witnessing a gradual change mainly in the cropping system, land use pattern, marketing system, utilization of inputs for farming, and in financial behavior of the farmers. On one hand, there is seen a huge shrinkage in the land area available for the agriculture due to expansion in the urbanization, while on the other hand, it was found that the demand for higher productivity and returns from the cultivated land is increasing rapidly. It was found that due to serious problems faced in the agriculture sector; most of the growers tend to shift mostly in favor to produce various horticultural crops such as fruits, vegetables, spices, flowers and other crops.

Horticulture is an important component of agriculture having significant role in the economy of the country. India's varied agro-climatic condition provides additional advantages in favor of growing of a wide variety of horticultural crops. India is blessed with various types of soils and varied agro-climatic conditions as a result of which the country has the advantages of growing a variety of horticultural crops in particular and other crops in general.

U.P.'s varied agro-climate permits growing of a large number of these crops throughout the year enabling their availability on a regular basis. The state holds a vast potential for the development of various horticulture crops as it has diver's climatic conditions for growing different categories of fruits and off season vegetables in its different agro zones. Therefore, horticulture has emerged as one of the major agricultural activities as there has been a substantial increase in both area and production of horticulture crops. Though horticulture sector plays an important role in providing employment opportunities to the farm population engaged in production, transportation, processing and marketing operation ,the horticulture sector and the growers engaged in the sector still revealed of facing various problems related to the various activity involved in the production of the crops.

Keeping into account these facts into consideration the present study was proposed for carrying out a detail study on issues related to the present status of horticulture sector across the districts of agro- zones of the state and its area and production. In this chapter an attempt

has been made to present briefly the major findings of the study undertaken in nine districts of the agro climatic zone in the state of Uttar Pradesh and to provide various suggestions related to the issues.

Since from the available literature in the Introductory chapter which explains that horticulture has potential of higher returns from land, it is often debated that farmers cultivating tiny pieces of land may not diversify towards these crops due to numerous constraints in production and marketing as well as price risks associated with these crops. It may be stated that, horticulture sector supply better food, higher income and yields higher returns from the land and create better purchasing power among the people. The Introductory chapter explains the objectives and methodology and Chapter Plan related to the study.

II: Objectives of the study

In detail, the study has following research objectives:

1. To estimate land use pattern under various agriculture and horticultural crops and its changing pattern across different geographical and agro- climatic conditions and at state level.
2. Pattern and emerging changes in productivity/yield rates of different agriculture and horticultural crops.
3. Pattern and emerging changes in output of different agriculture and horticultural crops.
4. Input use, cost of production, profitability of using land under different options and factors implicating variations in opting cultivation of different horticulture and other crops across the regions of the state.
5. Area specific emerging constraints in opting cultivation of different horticulture crops and measures to be initiated to overcome from these constraints.
6. Contribution of horticulture to GDP at district, region and state level.
7. To suggest about the types of measures to be initiated for maximizing land under the cultivation of horticulture crops**.**

III: Research Methodology

The study is confined to state of Uttar Pradesh. To fulfill the objectives of the study, both primary and secondary data have been used. The scope of the study was confined to growing of foodgrains, fruits, vegetables, spices, flowers and Medicinal / aromatic plants. The study proposed to select one district from each agro-climatic zone on the basis of highest area under

horticulture crops for field survey. Thereafter, two or three blocks, with the consultation of District Horticulture officer (DHO) has been taken to cover the different horticulture crops i.e. vegetables, fruits, flower and spices grown in the area has been selected from each district. Further, with the consultation of DHO, four villages from the selected blocks based on the same criteria have been chosen for detail study. Finally, 25 households from each village were selected on the basis of growing different horticulture crops in different size of land holdings for field survey. Thus, our total sample was 9 districts, 22 blocks, 36 villages and 900 households.

The study has been presented in 6 chapters. Chapter 1 presents the Introduction, review of literature, research problem, objectives and research methodology of the study. Chapter II presents the analysis of the secondary data to show the Horticulture Development in the Uttar Pradesh. Chapter III presents the socio- economic characteristics of horticultural growers. Chapter IV discussed about the area, production and productivity of various crops on basis of primary data. Chapter V explains the major constraints in the horticulture crops in the selected districts. The final Chapter summarizes the main findings of the study and gives suggestions for improving the condition of growers and to promote horticulture crops export from the country.

The foregoing analysis of the secondary data is explained in chapter II where area, production and productivity of various horticulture crops in state of Uttar Pradesh is explained which concludes that in terms of no. of projects, percent of share of project, subsidy allocation amount and percent share of subsidy, Uttar Pradesh is only behind Maharashtra. State of Uttar Pradesh has performed convincingly better during 2014-18 than proceeding period at all India basis as is evident from the fact that growth in area and production of all horticulture crops in State did exceptionally well during 2014-18 than 2009-13 and rank first in terms of CAGR in area, third in terms of CAGR in production among all other States of India during 2014-18. State has maximum area and production under total horticulture crops. Further, it concludes that in terms of CAGR (area and production) of all fruit crops, the state rank third and record respectively at all India level during 2014-18. In terms of CAGR of area and production of all vegetable crops, U.P. ranked first and third respectively at all India basis during 2014-18. Further, it concludes that in case of CAGR of area of all spices crops U.P. rank first but performed poorly in terms of CAGR (production) at all India level during 2014-18. U.P growth was not found satisfactory against all other states in total spice crops. In case of CAGR of area and production of other Horticulture (Flower and Aromatic), Uttar Pradesh

put up a poor performance at all India level during 2014-18. Though, it must be remembered that it did not performed much poorly in terms of production than area.

The major share of various horticulture crops in the state which concludes that though the mango constituted major share in area and production (TE-2018). Papaya led the way in terms of growth rate in area, production and productivity per hectare for all Major fruit crop in the State. The Potato constituted major share in area, production and productivity per hectare in the State for Major vegetable crops. The Garlic shared major area, production and productivity of Major spices crops in the state. Further, it explains the zone wise share and growth rate of various horticulture crops which results that in terms of area and production of total Horticulture crops, Central Zone and South West Semi Arid Zone dominated the State. The share of area and production for all fruit crops is most significant in Central Zone of the State. The share of area and production for All Vegetable Crops is most significant in Central Zone and South West Semi Arid Zone in the State. In terms of area and production of all spices crops, South West Semi Arid Zone and Central Zone Dominated the State. Hence, it can be concluded that Uttar Pradesh holds a vast potential for development of the sector, but it is still far from the realization of its actual potential. Hence, various suggestive measures by the government and the state should be taken for the commercialization of various horticulture crops and diversification of the horticulture sector in the state, in order to improve the socio economic characteristics of horticulture growers and to increase the productivity of the crops in the selected state.

The socio economic condition of the growers engaged in horticulture crops production is also analyzed which states that male population is larger than the female counterpart in all 9 districts which can prove to be boon for horticultural activities. Hence, this can be a significant factor that can be responsible for the growth of the horticulture sector. Further, in all 9 districts it reported that overall percentage of General category respondents are less than OBC and SC category which shows the socio economic condition of the growers and their family. Hence, it can be concluded that if efforts are taken, the economic condition and their livelihood of the family can be improved. The study confirmed that most of the people are self employed and taking agricultural activities as their primary occupation. So people have been on a look out for more rewarding activities like horticultural activities in all nine districts. The figures in the study confirmed that horticulture sector evolved to be the lifeline for these people. Since, they have tremendous land, potentiality and viability for growing of all kinds of horticulture crops. Animal husbandry is an important allied activity of the farmers in the district. Almost all the households were found to keep milch and draft animals. The

sampled household were found to keep about two milch animals on an average especially, she buffaloes. Over 95 percent households reported ownership of durable goods like cycle; mobile phones etc and most of the households own a motorcycle. The horticulture contributes 37.9 percent of household income and 15 percent contributed through agriculture, whereas animal husbandry contributes 9.7 percent of household income. It was also concluded that maximum 98 percent of households reported of having small equipments used in agriculture where 70 percent were having chaffs and other implements. It is important to notice that only 15 percent of households reported of having tractor and 19 percent reported of having tube well. It was also reported that most of the people were dependent on financial means of savings i.e. in banks. In short, the economic condition of the sampled households was fairly good as reflected in indicators of assets ownership and income levels as compared to previous income of households. Hence, it can be said that if efforts are taken the socio- economic condition of the growers of horticulture crops can be improved.

The study clearly demonstrated the benchmark survey of all the horticulture crops in the sample farms by determining the area, production and its yield on basis of primary survey. The study concluded the districts wise detailed analysis of cost incurred on various horticulture groups of crops. It also explains about the percent profit per acre of all horticulture crops on sample farms. It can be concluded that out of total gross cropped area, the food grain cultivation constituted maximum area under different horticulture crop followed by fruits, vegetables and cash crops where it was found that area under spices and flower cultivation have very low proportion in selected district. It also concludes that overall the yield per acre was highest for cash crops as potato was major specialization of growing of crops in maximum district. Overall Yield was also highest for other crops followed by total vegetables, spices and fruits. Mango was the most important fruit crops of the state accounting for over maximum proportion of the percentage. Other main fruits were banana, guava, papaya muskmelon, sitafal etc. A wide variety of vegetables are grown all over the state including potato, tomato, and cauliflower, Etc. Overall the table states that the total yield under vegetable crops was much better in Rampur and Amroha district. Further it concludes that chilli and garlic was the major spice crops in selected sample district than Coriander, Turmeric and Sauf. Rose, marigold and jasmine was the major flower crop in the selected sample farms. However, an effort should be made to raise the yield of popular flowers in the district by making all efforts. There has been a sharp increase in the area and output of horticulture crops in selected sample district. Further, our study reveals about the high potential of crop diversification for income enhancement of farmers. The study concludes and

explains about the cost structure for which the following items have been taken into account: Total cost of seeds, exp land prep, Cost of plantation, Exp Irrigation, Exp soil fertilizer, Exp pesticides, Labor cost, Cost wash brand pack, Sowing to transplanting transportation, Govt. revenue, Cost cold storage, Cost middlemen and others. It comes to conclusion that the proportion of labor cost for all crops was higher than other cost followed by cost of seeds, irrigation and land preparation. The percent profit per acre was 28.4 percent from 46.6 percent per acre income. Hence, it can be concluded that if farmers shift their area to horticulture crops, income can be increased and it can be more profitable to the farmers to grow more crops in the district. As, it has been well recognized that the horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas.

The views of farmers about different types of problems faced by them were also solicited during the survey. At the very outset, the chapter highlighted the issue that horticulture farming is not a pleasant work for these growers as most of the respondent sells their orchards to Traders and that too unwillingly and maximum respondents are selling their orchards before getting flowers by receiving half amount as most of the respondent reveals of delayed payment as the major reason for sale of their orchards. Problem in reallocation of the various horticulture crops are faced by the growers. The selling and market related challenges are the main problem which creates hindrance in improving the economic status of horticulture producers. The growers of the crops basically find it very difficult to sell off their produce to the ultimate customers. 88.8 percent of farmers were found to face problem in selling of their crops. Various competitions are faced by the growers in relation to its variety, price and its quality. Very low farmers reveals of receiving compensation for the loss of their crops from any government institution. Only 1.4 percent growers found to have insured of their crops.
Technological up-gradation and institutional changes are identified as thrust areas for future development of the horticulture sector. 41.3 percent growers wanted to diversify the crops in order to have higher profit. Further, the chapter highlights that despite of having information about restricted pesticides most of the farmers revealed of using it for the safety of their crops and to earn higher production and profit. Training may also help the growers to improve the economic condition. In the study it concludes that very low percentage of the growers was trained by various organizations. Hence, Government and other financial and training institute must be encouraged so as to develop horticulture farming and improve the condition of the growers. Major reason for taking loan is for farming purposes. Hence, government and other institute may come up with various suggestions in order to overcome the problem of

finance in horticulture farming and to improve the condition of farmers. Further the study concludes almost all the sampled farms were not registered under Geographical Indications i.e. 99.1 percent. Hence, it is important to provide them proper information regarding benefits by registering their crops under geographical indications. At the end farmers reveals of having their expectation by the government in order to overcome the problems faced by them where the major problem faced by them was due to lack of irrigation facility, hence, government should take proper efforts in order to cover up the problems faced by the growers in the cultivation of various horticulture crops.

In brief, the analysis shows that in spite of their strategic importance in terms of employment creation, the horticulture sector in selected districts play important role since it is facing severe problem from many point of view which need various strategies, suggestions and intervention to improve the quality of life of growers and the sector. The various government schemes and programmes introduced for the benefits of farmers were not effectively reaching the majority of the farmers. Hence, there is clear need of revamping these programmes at the gross root level.

IV: Suggestions:

The state like U.P. enjoys comparative advantage in horticulture crops because of its favorable agro-climatic factors suitable for growing a large variety of horticulture crops. Horticultural output has increased at a fairly encouraging rate in the recent years due to the impetus provided by growing demand for these products. This market led process is still too small to have a large impact on the agricultural economy of the state and needs to be supported through public policy in a systematic manner.

These are the various recommendations suggested in order to improve the productivity of the crops and also to help in increasing the income of the farmers engaged in cultivation of various horticulture crops. It can be said that if efforts are made in proper and effective way, its weakness can be converted into its opportunities and also help in improving the socio-economic condition of the growers involved in the farming. It can be concluded that if farmers shift their area to horticulture crops, income can be increased and can be more profitable to the farmers to grow various type of crops in the districts. The policy package to promote the process of crop diversification should include among other things the following:

Improvement in the rural infrastructure particularly in the field of storage, transport and marketing of these crops: It has been reported that more than 20-30 per cent of the produce is lost in the post-harvest operations. This is mainly because of factors like non-

availability of proper infrastructure in terms of facilities for handling the produce, poor transport & road condition and lack of storage and ware- house facilities discourage the farmer to diversify their crop. Government would have to invest on public transport, roads and most important on cold storages and warehouses to motivate the growers to diversify their crops and increase the area under horticulture crops. Irrigation was the major problem revealed by the farmers in the districts. Hence, adequate and regular irrigation facility should be provided by the government.

Strengthen the Marketing System: The study revealed that middlemen are considered as a necessary evil in the marketing system. Two types of measures need to be directed for controlling the activities of middlemen. These are (i) regulating the marketing system, and (ii) creating alternative channels of trade for marketing of horticultural crops.

Organization of farmers on cooperative and group basis to take up production, processing and marketing of horticultural produce and other high value crops. The main features of the organizations may include establishment of collection centers in growing regions and regulation of all buying/selling activities through the organizations at the market yards.

Further, registration of all growers of the region with the organizations, advancement of loans at lower rate of interest, distribution of inputs on subsidized rate through collection centers, etc. are other features desired for. The Department of Horticulture (DoH) can be closely associated with the organization and some responsibility of collection centers can be entrusted to their field staff.

Minimum Support price System for Horticulture Crops also: The horticulture growers faces the problem related to the prices of different crops. Government must interfere to decide the minimum price of all horticulture crops as the price of wheat and rice. It will give a kind of security to the growers specially vegetables growers.

Encouragement to agro-processing industries in the rural areas on a widespread basis: Fruit processing industries have enough potential to grow in the future**.** Government should invest on the processing industries in the different pockets of horticulture growing regions especially in the fruit growing pockets. It will increase the prices of the produce as well as increase the employment in the sector which would lead to increase the demand. It will also be helpful to increase the export of the fruits in terms of different processesed products and increase the self-life of the fruits.

Availability of Adequate Institutional Credit: Credit Support is required during the period when farmers are not able to sell their produce. Credit is required for crop establishment and maintenance, installation of on farm infrastructure, such as drip irrigation, processing units, export credit, etc. As most of the growers are from the marginal and small farmer groups, banks may provide them adequate credit on lower rate of interest. In the process the middlemen get the major share of benefit from the investment of the primary producer. Thus, there is an urgent requirement to reorganization the rural credit delivery system to support the higher credit requirements of high value crops.

Adequate Provision of Improved Varieties of Seeds and Planting Material to the Farmers. Farms inputs and credit availability to the farmers should be easily available and must be provided at lower costs. Cost of seeds was highest in almost all districts. Hence, proper arrangements should be made for timely supply of good quality of seeds at lower cost. Besides, growers use harmful chemical and pesticides to save their crops from insects and to improve the productivity. Government should ban these chemicals and pesticides and provide them the harmless chemicals & others fertilizer on subsidized rate and should also motivate them to adopt organic farming.

Data and information: One of the major problem was non availability of proper and authentic data at the district level. Block wise data related to various horticulture crops are also not available at the district level. Hence proper measure should be taken by the government and Horticulture department in order to collect authentic data at the block level and village level. It is suggested that data on area, production and yield also need to be streamlined after conducting proper survey. Data generated by the Department and other agencies at the field level vary to a large extent. Similarly, there is a need to streamline the data and put in place a system to update and publish the data on market arrival and prices of different horticulture crop-wise.

Undoubtedly, the area, production of horticulture crops has improved to some level, but yield was not up to the mark as expected. Therefore, serious policy efforts are needed to increase the potential and improve the productivity of various crops at state and district level.

Strengthening of the Research and Extension Services: Strengthening of the Research and Extension Services oriented towards horticulture crops in the different agro-climatic zones of the State is the need of the hour. Field studies observe that there is lack of training and awareness generation on various cultivation practices for producing different type of horticulture crops especially flowers, medicinal plants and others. Growers have inadequate

knowledge regarding the proper operation, maintenance and about new techniques of the farming system of horticulture crops particularly in case of fruits and flowers. Hence, time to time training programme related to the new techniques in order to improve the pre and post-harvest management should be organized for the growers at district level. Majority of the growers are not aware about the schemes related to horticulture as well as diversification of crops. So, government and other agencies should organize awareness programmes related to such schemes at the places where growers are residing. Government should come up with proper training centers and soil testing centers at the block level to increases the productivity of different crops.

Improve the staff at District level: Horticultural departments are sufferings from the lack of staff at the district level for providing the required extension services. The Horticulture Department of the State Government has been facing shortage of staff. There is inadequate awareness on post-harvest needs and its technology among the mango growers and traders.

Branding and Registration for Geographical Identity of different crops: There are several varieties, which need to be identified and given a geographical identity. Such varieties are dependent on specific soil and climatic conditions. The Department of Horticulture may identify and make efforts to enlist the places linked with a particular variety of mango and thereafter attempt for registration of geographical identity of such local varieties, branding mango in such a way that it would lead to integrated growth of that crop. Mango is one example other crops too reiterate such efforts under GI scheme to enhance its coverage and income of the horticulture crop growers in the State.

In this endeavor there is ample scope for cooperative action by the public and private sectors. While in many areas like research, extension, development of rural infrastructure and organization farmer's group direct initiative may have to be taken by the government, public policy should aim at involving the private sector in its initiatives and should play a promotional role to encourage the private sector to come forward in a big way to exploit the potential of agricultural diversification.

Reference

Gogoi, M., and Borah, D. (2013), "Baseline data on area, production and productivity of horticulture crops in North East and Himalayan states - A study in Assam, Jorhat", Study No. 142 , Agro-Economic Research Centre for North-East India Assam Agricultural University Jorhat – 785013, Assam 2013 , pp. 16-67.

Jat, M. L., Gupta, R. K., Erenstein, O., & Ortiz, R. (2006) "Diversifying the intensive cereal cropping systems of the Indo-Ganges through horticulture", *Chronica horticulturae*, *46*(3), 27-31.

Joshi, P. K., Joshi, L., & Birthal, P. S. (2006), "Diversification and its impact on smallholders: Evidence from a study on vegetable production",. *Agricultural Economics Research Review*, *19*(347-2016-16776), 219-236.

Mittal, S. (2007). *Can horticulture be a success story for India?*, Working paper, No. 197, Indian Council For Research On International Economic Relations, New Delhi.

Mittal, Surabhi (2009), "Feasibility Check for Diversification towards Horticultural Production," *Agricultural Economics Research Review*, Vol. 22 (1), January-June.

Pradhan, N. S. (2005), "Study on technological gap and constraints in adoption of flower crops in Delhi", Ph. D. Thesis (Unpublished), C.C.S.U., Meerut, UP.

Pratap Birthal, S., P. K. Joshi, Sonia Chauhan and Harvinder Singh (2008), "Can Horticulture Revitalize Agricultural Growth," *Indian Journal of Agricultural Economics*, Vol. 63 (3), July-September.

Some data extract from the Websites of Different Government Department as:

Mission for Integrated Development of Horticulture (**MIDH**), Report, 2018-19), ,http://nhb.gov.in/

National Horticulture Board, Ministry of Agriculture and Farmers Welfare Government of India

http://nhb.gov.in/Statistics.aspx?enc=WkegdyuHokljEtehnJoq0KWLU79sOQCy+W4MfOk01GFOWQSEvtp9tNHHoiv3p49g,_http://agricoop.nic.in/statistics/state-level

Horticulture and Food Processing Department, UP Govt., UP Udhyan Bhawan, 2-Sapru Marg, Lucknow,http://uphorticulture.gov.in/

Agricultural and Processed Food Products Export Development Authority (**APEDA**), https://agriexchange.apeda.gov.in/indexp/reportlist.aspx

***Agricultural Census of India*, 2001 & 2005**, http://agcensus.dacnet.nic.in/

State Horticultural Mission Report, 2013, http://agricoop.nic.in/statistics/state-level)