BASELINE DATA ON AREA, PRODUCTION AND PRODUCTIVITY OF HORTICULTURE CROPS IN HIMACHAL PRADESH

Pratap
Meenakshi
C.S.Vaidya
Ranveer Singh

AGRO-ECONOMIC RESEARCH CENTRE
HIMACHAL PRADESH UNIVERSITY
SHIMLA-171005

2013

CONTENTS

#			PAGE
	Executive Summary		**i-vi**
1	**INTRODUCTION**		1
	a	Introduction	1
	b	Importance of Horticulture crops in H.P.	2
	c	Scope for the Study	3
	d	Objectives	4
	e	Methodology and Data Source of the Study	4
2	**GROWTH AND DEVELOPMENT OF HORTICULTURE CROPS IN THE STATE**		7
	A	Area, Production and Yield	7
		District wise Area, Production and Yield of Fruits	8
		District wise Area, Production and Yield of Vegetables	9
		District wise Area, Production and Yield of spices	10
		District-wise Area, Production and Value of flowers	11
		Year wise Area and Production of Horticulture Crops	12
	B	Infrastructural Facilities Available for Horticulture Crops	13
		Production Facilities	13
		Disposal Facilities	13
		Institutional support	13
		Potato Seed Development Stations	14
		Vegetables Development Stations	14
		Ginger Development Stations	14
	c	Schemes for the Development of Horticulture	14
		Green houses	15
		Soil and Water conservation	15
		Packing Materials	15
		Fruit Marketing and Market Intervention Scheme	15
		Horticultural Diversification	15
		Quality Improvement	16
		Horticulture Technology Mission	16
		Vegetable Development Project	16
		Ginger Development	16
		Agricultural Marketing	16
		Farmers Training and Education	16
	d	Plan Investment in Horticulture	16
	e	Problems of Horticulture Crop's Growers	18
		Post Harvest Handling, Marketing and Processing	18
		Small Land holding Size	19
		Irrigation	19
		Global Warming	19

		Erratic Rains	19
		Adverse Market Situation	20
		Inaccessibility to Extension Services	20
		Labour Shortage	20
		WTO and Opening up of Indian Market for international Agriculture Trade	20
		Declining Secondary Assets	20
		Extension of Commercial Agriculture to Marginal Lands	21
		Spurious Inputs	21
	f	Summing up	22
3	**SOCIO-ECONOMIC CONDITIONS OF THE HORTICULTURE CROPS GROWERS**		23
	a	Background of the Respondents and the Households	23
		Age Group	23
		Education Level	24
		Caste	26
		Religion	26
		Distance of the village from Nearest Main Market	26
	b	Land Ownership Detail/Cropping Pattern	26
		Land Size classification	26
		Land Owned by the Households	27
		Distribution of Irrigated Area by Source	28
		Cropping Pattern of Selected Districts	28
	C	Motivating Factors for Cultivation of Horticultural Crops	28
		Preference-wise Motivating Factors for taking up Horticulture Crops	29
	d	Summing up	30
4	**MAINTENANCE OF HORTICULTURE CROPS**		37
	a	Destruction and Rejuvenation of Horticulture Crops	37
	b	Kitchen Garden/Bund/Rooftop Plantation	37
	c	Adoption of New Technology by the Farmers	37
	d	Benefits Received from the Government for the Development of Horticulture	38
		Problems faced by the respondents	38
		Farmers contacted by the agencies	39
		Prospects of Horticulture Expressed by the Farmers	39
		Suggestion for development of horticulture in Himachal Pradesh	39
		Summing up	44
5	**METHODOLOGIES ADOPTED AND TRAINING PROGRAMME CONDUCTED FOR ESTIMATING HORTICULTURE CROPS**		45
	a	Methods Adopted by Department of Land Records	45
		Estimation of Area Under Crops	45
		Estimation of Production and Productivity of Crops	46
	i	Random Sampling Method	46

	ii	Traditional Method	46
	b	Method Adopted by Department of Agriculture	46
		Estimations of Area Under Kharif and Rabi Crops	47
		Estimations of Productivity of Potato and Ginger	47
		Estimation of Area, Production and Productivity of Vegetables Crops other Than Potato and Ginger	49
	c	Methods adopted by Department of Horticulture	49
		Fruit Crops	50
		Estimation of Area Under Fruit Crops	50
		Estimation of Production and Productivity of Fruit Crops	51
		Flower crops	51
		Estimation of Area Under Cut Flowers	51
		Estimation of Production and Productivity of Cut Flowers	53
	d	Training and Extension Programmes Conducted for Officials for Estimation of Horticultural Crops	53
6	**SURVEY RESULTS OF HORTICUOLTURE CROPS**		59
	a	Area, Production and Yield of the Sample Villages	59
		Area, Production and Yield of Fruit (Apple crops)	59
		Area, Production and Yield of Vegetable Crops	59
		Area, Production and Yield of Flowers (Chrysanthemum)	60
		Area, Production and Yield of Spices (Ginger)	60
		Source of irrigation	62
		Per hectare number of plants	62
		Mono and mixed cropping system	63
		Farm gate prices	63
	b	Area, Production and Yield Estimated by the Different Agencies	67
		Area, Production and Yield of Apple	67
		Area, Production and Yield of Vegetables	67
		Area, Production and Yield of Flowers (Chrysanthemum)	68
		Area, Production and Yield of Ginger	68
	c.	Difference Between the Two Estimates	68
	d	Summing up	72
7	**DIFFICULTIES ENCOUNTERED BY THE AGENCIES WHILE COMPLING HORTICULTURE DATA**		75
	a	Department of Revenue	75
	b	Department of Agriculture	76
	c	Department of Horticulture	77
	d.	Suggestions	77
	e	Summing up	78
8	**CONCLUSION AND POLICY IMPLICATIONS**		81
	a.	**Brief Findings of the Study**	81
	b.	**Conclusion and Policy Implications**	84
		Annexure	86-88

LIST OF TABLES

#	TITLE	PAGE
1.1	Details of districts, blocks, villages and crop selected for the study	5
1.2	Classification of farm households in selected villages	6
2.1	Growth of Horticultural crops in Himachal Pradesh	8
2.2	District-wise Area, Production and Yield of Fruits	9
2.3	District-wise Area, Production and Yield of Vegetables	10
2.4	District-wise Area Production and Yield of Spices	11
2.5	District-wise Area Estimated Production and Value of Flowers	12
2.6	Year wise Area, Production of Horticulture Crops in H.P.	13
2.7	Investment in Horticulture Culture	17
2.8	Investment in Horticulture Culture under H.T.M.	17
2.9	Crop Category Wise Investments in Horticulture Sector by Agriculture Department	18
3.1	Distribution of respondents by age-group (%)	31
3.2	Distribution of Family members by age group	32
3.3	Distribution of respondents by education levels	32
3.4	Distribution of Highest educated person in the sample households	32
3.5	Distribution of respondents by caste(%)	33
3.6	Distribution of respondents by religion	33
3.7	Distance between village and the nearest main market	33
3.8	Total number of earning members in the sample households	33
3.9	Distribution of respondents by land size classification	34
3.10	Land owned by the households	34
3.11	Distribution of leased in and leased out land by terms and conditions	34
3.12	Distribution of irrigated area by source (%)	34
3.13	Year of starting the horticultural crops by the farmers (%)	35
3.14	Cropping Pattern of Selected Districts in Himachal Pradesh	35
3.15	Motivating factors for taking up horticulture crops (multiple response %)	35
3.16	Preference-wise motivating factors for taking up horticulture crops (%)	36
4.1	Horticulture crops plants rejuvenated by the farmers in the 5 years	39
4.2	Number of households having kitchen garden/rooftop/backyard	40
4.3	Horticultural crops plants in the field bund lands	40
4.4	Adoption of high technology by the farmers in 2010-11	41
4.5	Benefits/extension services received by the farmers in 2010-11	41
4.6	Problem faced by the farmers in application of high technology in 2010-11	41
4.7	Nature of problems faced by the farmers	42

4.8	Number of farmers contacted by agencies	42
4.9	Three most important future prospects of horticulture	43
4.10	Suggestions given by farmers	43
5.1	Detail of plant and flower production calculated on the basis of per sq. mt. package of practices for Floriculture crops published by University of horticulture and forestry Nauni, Solan Himachal Pradesh	52
5.2	Agencies involved in collection of horticulture data	53
5.3	Data collecting agency and the crops covered with area, production and yield	54
5.4	Method adopted for collection of data (area) on horticulture, department of horticulture	54
5.5	Method adopted for collection of data (area) on horticulture, department of Revenue	55
5.6	Method adopted for collection of data (area) on horticulture, department of Agriculture	55
5.7	Method adopted for collection of data (Production) on horticulture, department of horticulture	55
5.8	Method adopted for collection of data (Production) on horticulture, department of Revenue	56
5.9	Method adopted for collection of data (Production) on horticulture, department of Agriculture	56
5.10	Forwarding collected data and verification of horticulture crops (Department of Horticulture)	57
5.11	Forwarding collected data and verification of horticulture crops (Department of Agriculture)	57
5.12	Forwarding collected data and verification of horticulture crops (Department of Revenue)	57
5.13	Training conducted for estimating of area, production and yield	58
5.14	Comparison of data on horticulture crops with other agencies	58
6.1	Area, production and yield of horticulture crops annual 2010-11 fruits	61
6.2	Area, production and yield of horticulture crops-kharif vegetables 2010-11	61
6.3	Area, production and yield of horticulture crops annual 2010-11 flowers	62
6.4	Area, production and yield of horticulture crops annual 2010-11 spices	62
6.5	Distribution of irrigated land area under Horticulture Crops	64
6.6	Number of plants in the area covered during different seasons	65
6.7	Distribution of area under mono and mixed cropping seasons	66
6.8	Area, production and farm gate price by season	66
6.9	Area, Production and Yield of Horticulture Crops	74
7.1	Problems faced by different agencies while collecting data (Deptt. of Horti.)	79

7.2	Problems faced by different agencies while collecting data (Deptt. Of Agri.)	79
7.3	Problems faced by different agencies while collecting data (Deptt. Of Revenue)	79
7.4	Crops not covered in the estimations and reasons	80
7.5	Suggestions made by different agencies for the improvement of horticulture crops	80
Ann. 1	Block wise area under different fruits in H.P.	86
Ann. 2	Block wise area of fruits in district Shimla	87
Ann. 3	Block wise area vegetables in district Shimla	87
Ann. 4	Block wise area of flowers in district Sirmour	88
Ann. 5	Block wise area of condiments and spices in district Sirmour	88

LIST OF FIGURES

#	TITLE	PAGE
3.1	Distribution of respondents by age group in village under study (%)	23
3.2	Literacy rate in villages under study (%)	25
3.3	Distribution of respondents by education levels (%)	25
3.4	Distribution of respondents by land holding in the village under study (%)	27
3.5	Average size of land holding in selected villages (ha.)	28
3.6	Motivating factors for taking up horticulture crops in villages under study (%)	29
6.1	Source of irrigation in villages under study	63
6.2	Yield of apple estimated by own survey and government agency (kg/ha)	69
6.3	Yield of kharif vegetables estimated by own survey and government agency (kg/ha.)	70
6.4	Yield of rabi vegetables estimated by own survey and government agency (kg/ha.)	70
6.5	Area of chrysanthemum estimated by own survey and government agency (ha.)	71
6.6	Yield of chrysanthemum estimated own survey and government agency (sticks/ha.)	71
6.7	Yield of ginger estimated by own survey and government agency (kg/ha.)	72

EXECUTIVE SUMMARY

Abstracts: *There is a general feeling that data-base of horticultural crops is not comprehensive and reliable in the country. Collection of proper and accurate data on area, production and productivity of horticulture crop becomes extremely important for further development of this sector. However, the data collected have some discrepancies in terms of non-inclusion of important crops, irregular enumeration and faulty methodology, etc. The present study makes an attempt in this very direction with a focus on Himachal Pradesh. The study reveals that there is no difference in area under fruits, vegetables and spices crops in the selected villages estimated by revenue department, horticulture department and obtained by survey. But there was significant gap in both production and yield of these crops estimated by survey and measured by state agency. The area and production of mixed crops is not recorded by any state agency at village or block level. The gap in the yield of apple of survey and state agency worked out to be 25145 kg per hectare which is 491 percent higher than that of yield estimated by horticulture department. In case of kharif vegetable crops, except cauliflower, yield of other vegetable crops estimated by the state agency is higher than that of yield measured by survey. These yield gaps ranged between 4.37 per cent in case of potato to 60.94 per cent in case of tomato. In rabi vegetable crops, yield gaps ranged between 12.96 per cent in case of cauliflower to 56.10 per cent in case of peas. The area under flower crop measured by survey is 26 percent higher than estimated by state agency. The yield of Chrysanthemum estimated by state agency is more than double as compared to survey data. Yield of ginger measured by survey is 5.02 percent higher than the state agency estimation. The major reason for the poor quality of horticulture crops statistics is the failure of the revenue official (Patwari) to devote adequate time and attention to the Girdawari. Appropriate jurisdiction of villages, provision of honorarium/incentives for work in off-hours is the major suggestions made in the study.*

Objectives of the study

1. To collect data on area, production and yield of horticultural crops and compare with the baseline data collected by the Department of Horticulture, Revenue Department and Directorate of Economics and Statistics and so on.

2. To identify the horticultural crops on which proper statistics is not being compiled at present among the selected states.

3. To study the problems encountered by the grass-root officials while collecting the horticultural data.

4. To identify the problems in estimation of horticultural crops and to suggest policy measures.

Methodology and Data Source of the study

Both secondary and primary data was collected to achieve the objectives specified above. One Schedule for the Officials is prepared whereby district/block and village level officials were visited to collect information related to area, production and yield for the horticultural crops in Himachal Pradesh. The state agencies that collect data on horticultural crops belong to Departments of Horticulture and Agriculture, and Revenue (village accountant). Additional information was collected from the officials on methodology adopted, verification process carried out in collection of horticultural data and problems encountered by them in compilation of horticultural statistics. Information on area, production and yield of horticultural crops/crop groups was collected for the village and household level from the above mentioned state agencies. After collecting information from the secondary sources, one village in each district growing highest area under each crop category (fruit/vegetable etc) was selected and complete enumeration was carried out in the village for those households who are growing horticultural crops. For this purpose, a Household level Schedule was prepared for the cultivators of horticultural crops. In Himachal Pradesh district Shimla was selected for fruit and vegetable crops as this district has highest area under these crops in the state. Further, Theog block for vegetable crops and Jubbal block for fruit crops was selected on the basis of having highest area under these crops. The village Dharesh Gawech for vegetable crops in Theog block and village Dhali for fruit crops in Jubbal block were selected for complete enumeration. The highest area under spice and flower crops was in the district Sirmaur. Thus, this district was selected for these crops. In this district, Paonta Sahib for spice crops and Rajgarh block for flower crops was selected on the basis of highest area under these crops. Further, village Sargaon for flower crops in Rajgarh block and village Toru-Bhaila for spice crops in Paonta Sahib block was selected for complete enumeration.

Main Findings of the Study

The study reveals that the area has increased significantly under fruits and flowers from 67.531 thousand hectares in 2007-08 to 79.024 thousand hectares and 0.583 thousand hectares in 2007-08 to 0.682 thousand hectares in 2009-10 respectively. Whereas the area of spices was almost same during this period. The area of vegetables has slightly decreased from 35.764 thousand hectares to 35.672 thousand hectares during the period of study. As far as yield is concerned, the yield of spices, vegetables and flowers has increased significantly. Whereas yield of fruits has decreased during the period of study.

Shimla district alone accounts for 43 per cent of area and 48 per cent of total production in the state. The area and production of all fruits has been continuously increasing in the state and in the opinion of many experts a stage has been reached where horticulture sector is being extended to marginal lands. This is having negative impact on productivity and profitability of horticulture sector. It is being advocated that policy should increasingly cater to productivity enhancement rather than on increasing area. The area of various vegetables in the state during the year 2009-10 is 35672 hectares. Shimla district ranked first in area under vegetables, followed by Sirmour. The productivity of vegetables was higher in Hamirpur district followed by Bilaspur. The area under flowers has increased from 583 hectares to 682 hectares. The district Sirmaur has highest area under flowers, followed by Kangra and Solan. The share of Sirmour district in total area of flowers is 59 percent during 2009-10 year. Ginger is cultivated in all districts of the state excluding Kinnaur and Lahual- Spiti. The district Sirmaur, Solan and Bilaspur are the major areas for producing quality ginger. Poor quality planting material including seed and root stocks; poor layout of orchards; lack of appropriate polynizer in the orchard, lack of proper training and pruning of the fruit trees; inadequate plant nutrition and organic matters; lack adequate use of plant protection materials; poor overall management of orchards are the major problems in horticultural crops. Post harvest quality controls almost non-existent resulting in considerable wastage and damage. The goals of planning in Himachal Pradesh, clearly shows that the planners in Himachal Pradesh have, by and large, followed the framework and objectives of the National Plan and have thus failed to give the much-needed

regional focus for planned development in the context of the distinct physical features and environmental conditions of the State.

The maximum respondents were illiterate in the case of spice growing households and all persons were literate in the case of fruit growing households. Forty eight percent of the respondents were educated up-to high school level and 16 percent were illiterate in all the categories of households. The highest educated persons in most of the households were up to secondary level. The majority of the farm households fall in the general category and few households belong to scheduled castes and other backward castes. The religion of all the families is Hindu. The distance of the village from the nearest main market was maximum in the case of floriculture and minimum for the vegetable growing village.

In the surveyed villages 61 per cent growers belong to marginal category. The proportion of land under irrigation was relatively higher in the flower grower village as compare to other villages under study. The leased in and leased out system of land was non-existent in the villages under study. The average size of holding was relatively higher (1.37 ha.) in the case of spice growers and lesser (0.61 ha.) in the case of flower growers.

The result of cropping pattern reveals that the total gross cropped area (GCA) of Shimla district was 86878 hectares in 2009-10. Out of total GCA, 48 percent area was under fruits followed by cereals and millets 31 percent, vegetables 13 percent and pulses about 7 percent. There was marginal area under sugarcane, spices and oilseeds crops. Further it may be seen from the table that there was no area under fodder crops and non food crops in this district. The gross cropped area (GCA) of Sirmaur district was 74089 hectares in the same year. The area under cereals and millets was highest (75 percent) followed by vegetables (about 7 per cent), spices (5.35 percent) and pulses (5 percent). It is also revealed from the table that the area under fodder crops and other non food crops was 2.87 and 0.21 percent respectively.

All the surveyed growers had started to grow the horticulture crops more than 10 years back. In all the categories ‘good price’, which is first in ranking, remained the main motivating factor

for taking up horticulture crop. The Govt. support' is not a motivating factor in any of these crops.

In fruit growing village 2382 apple plants were planted for rejuvenation of the orchards in the area of 6.90 hectares in the last 5 years. The reason for rejuvenation of orchards was destruction of plants due to disease, drought, soil erosion and old age of the plants. The kitchen gardening is practiced only by the vegetable growers in the total surveyed households. These farmers grow pumpkin, spinach, gourd, arbi, tomato, chillies, cucumber, carrot, radish, coriander, turnip and methi in their kitchen gardens. No farmer was growing horticulture crop on the rooftop, in the backyard of the house and on the bunds. All the fruit and flower growers have adopted the technology INM/IPM in the area of 42.77 ha and 9.48 ha respectively. None of the vegetable and spice growers has adopted any kind of technology. In the case of fruit growers, all have received the benefit from the Govt. under the National Horticulture Technology Mission (NHTM) in the form of plants and equipments. About 96 percent flower growing households have received the benefit from the Govt. in the form of subsidy. None of the vegetable and spice growers received assistance from the Government in any form.

The Department of revenue for area of vegetable crops, fruit crops and ginger, department of horticulture for estimation of area and production of flower crops, yield and production of fruit crops and department of agriculture for estimation of production and yield of ginger and vegetable crops are state agencies involved in estimation of area, production and productivity of horticulture crops in Himachal Pradesh. The yield of apple is estimated by observation for which Horticulture Extension Officer visited area during harvesting season. The area under vegetable is recorded by revenue official at village level. The yield is estimated by field observation of crop condition by the officials of agriculture department. The estimation of area, production and yield of flower crop is carried out by the department of horticulture. The area under ginger is recorded by the village revenue official. The yield is estimated by the agriculture department through crop cutting experiment under the scheme GCES. The area under mixed crops is not recorded by any state agency at village or block level. Production of mixed crops is also not recorded at any level by the state agencies. However, there is large

quantity of mixed and inter crops produced in all the four villages under study. Inter cropping system in fruit crops is also in practice which is not recorded by any state agency involved in area and production of fruits. In case of flower crops systematic/proper recording of area, production and productivity is completely missing. The area under apple in the village estimated by revenue department and obtained by survey is same while variation is observed in yield estimation. The gap in the yield of apple of survey and state agency worked out to be 25145 kg per hectare which is 491 percent higher than that of yield estimated by horticulture department. In case of kharif vegetable crops, except cauliflower, yield of other vegetable crops estimated by the state agency is higher than that of yield measured by survey. These yield gaps ranged between 4.37 per cent in case of potato to 60.94 per cent in case of tomato. In rabi vegetable crops, yield gaps ranged between 12.96 per cent in case of cauliflower to 56.10 per cent in case of peas. The area under flower crop measured by survey is 26 percent higher than estimated by state agency. The yield of Chrysanthemum estimated by state agency is more than double as compared to survey data. Yield of ginger measured by survey is 5.02 percent higher than the state agency estimation.

Conclusion and Policy Implications

The major reason for the poor quality of area statistics is the failure of the revenue official (*Patwari)* to devote adequate time and attention to the *girdawari*. The fact is that the *Patwari* is overburdened with multifarious functions and has a large geographical jurisdiction extending to over more than 10 villages in the state. It is suggested to declare the *girdawari* as a programme of high priority and the *Patwari* be mandated to carry out the crop inspection according to the prescribed time schedule, if necessary, by sparing him from other duties during that period.

To improve the statistics of area, production and yield of horticultural crops in Himachal Pradesh the following suggestions are made:-

The systematic and periodic training should be imparted to Patwari and the fieldwork should be subjected to intensive supervision by the technical staff. There should be strict supervision of

fieldwork by higher-level revenue and agricultural officials and appropriate action taken against those whose performance is consistently bad. For proper and timely conduct of the *girdawari*, the concerned supervisory staff should be made accountable. To reduce the burden of the Patwari, his jurisdiction of villages should be reduced. There should be provision of honorarium/incentives for work in off-hours. There should be direct interaction between the Improvement of Crop Statistics (ICS) staff and the higher level officials of revenue and agricultural departments to get the accurate statistics.

Executive Table

#	Particulars	Dhali	Dharash-Gewech	Sargaon	Toru-Bhaila
1	Size of sample	63	114	46	111
2	Total land (ha.)	46.23	114.15	28.16	151.75
3	Irrigated land (%)	0	6.35	89.20	28.06
4	Average size of holding (ha.)	0.73	1.26	0.61	1.37
5.	Source of irrigation-tank (%)	-	100.00	100.00	-
6	IPH Kuhl (%)	-	-	-	100.00
7	Area under study crops by agency	42.77	62.44	9.48	26.61
8	Area under study crops by survey	42.77	62.44	7.52	26.61
9	Gap in area (%)	0	0	26.06	0
10	Yield estimated by survey (kg./ha.)	24335	Kharif 5013 to 28685 Rabi 4600 to 23693	403603 sticks	7877
11	Yield estimated by agency (kg./ha.)	5121	Kharif 10480 to 36000 Rabi 10000 to 36000	810000 sticks	7500
12	Yield gaps (%)	491	Kharif 5 to 61 Rabi 13 to 56	502	5

Chapter 1

INTRODUCTION

a. Introduction

Horticultural sector in India has emerged as an important sector for the diversification of agriculture. At present, this sector is contributing to the country's economy in a great manner through increased productivity, generating employment and enhancing exports apart from providing protective food, household nutritional security, and precious raw materials for various processing and ancillary industries. Realizing these advantages in the country, thrust has been given to this sector with reasonable investments under Five Year Plans and special programmes. As a result, the area, production, productivity, exports and its contribution to the GDP of agriculture has increased over the period of time. The area under horticultural crops has increased from 127.70 lakh hectares in 1991-92 to 208.76 lakh hectares in 2009-2010, and production has also increased from 965.62 lakh tones to 2230.89 lakh tons during the same period of time. The annual growth rate was more than 6.5 per cent, contributed about 30 per cent of the GDP of agricultural sector with a mere 10 percent of the Gross Cropped Area (GCA), contributing 54.55 percent total export earnings in agriculture sector.

The contribution of this crop in the hilly states of NER and Himalayan states is very significant compared to other agricultural crops. However, the data collected in these states have some discrepancies in terms of non-inclusion of important crops, irregular enumeration and faulty methodology, etc. Therefore, collection of proper and accurate data on area, production and productivity of important horticulture crop of the respective states becomes extremely important for further development of the sector.

Despite impressive development in horticultural sector in recent years, there is a general feeling that data-base of horticultural crops is not comprehensive and reliable in the country. The situation is still worse in the case of NE region and Himalayan states (11 states). This

poses a serious problem in understanding the real development of horticulture sector in these states. Besides, there is no systematic data on some marginal and minor horticultural crops in these states. To fill this gap, it is necessary to identify the methodology followed in collection of horticultural statistics, identify problems faced in data collection of horticultural crops by various agencies and take some remedial measures in order to make data on horticultural sector more scientific and factual. The present study makes an attempt in this very direction with a focus on North-east and Himalayan states. The study intends to collect baseline data on area, production and yield for some selected villages from the state agencies collecting such data and then do the verification from the concerned households through primary survey. The primary village level survey will verify the discrepancies of the data collected by different agencies of horticulture crops. This will help to highlight changes required at the policy level in the process of data collection of horticultural commodities and to improve the data collection process at various levels. This will help policy makers in the Centre and States to chalk out a programme for further development of the sector.

b. Importance of Horticulture crops in Himachal Pradesh

The climatic conditions varying from sub-tropical to temperate make the state suitable for growing a wide variety of cash crops such as temperate fruits, potatoes, vegetables, ginger, etc. Since the scope for extension of cultivation to newer areas, is limited due to topography, soil conditions etc, emphasis for increasing the farm incomes and living standards of the rural people, has to be laid on increased production by maximizing output per unit area available for cultivation. This can be best achieved by recognizing the fact that, commercial crops particularly fruits have vast potential for increasing the incomes and provide policy prescription accordingly. Alternatively, the agricultural income could be increased by changing cropping pattern towards commercial crops and ensuring higher resource allocation for such crops. The emphasis has been laid on both in all the Five Year Plans. The result was that not only the productivity of major crops, especially maize increased over a period of time, the most spectacular performance could be seen in the field of commercialization of agriculture. The

strategy in this respect has been two pronged depending upon the agro-climatic suitability and availability of infrastructure. In certain areas the horticulture (fruit crops) became popular and in certain others the stress was laid on vegetable cultivation. Major motivating factor has been identified to be the comparative profitability of fruit and vegetables over the traditional field crops.

Switching over to commercial agriculture has been an effective strategy for saving the farmers from the vicious circle of low income and low investment prevalent in case of traditional agriculture. The higher income per unit of land resulted in higher capital formation on the farms and made them more food secure, rather made such farmers so well off that some of the villages in district Shimla have been reported to be enjoying one of the highest per capita incomes in Asia. However, the task of this transformation has been neither easy nor it could be realized over a short span of time. In fact, it took almost a century to come to present level of fruit production in the state.

c. Scope for the study

Himachal Pradesh is treated as a model for development for other hilly areas. This is mainly because of the integrated strategy of scientists and planners of the State who successfully undertook the programmes like 'lab-to-land' etc. Most importantly, the development of infrastructure in the form of roads, irrigation, credit provision, telecommunication and effective extension services etc. were the crucial factors. Almost entire state is capable of producing different type of fruits. The sub-temperate areas have been traditionally known for production of quality apples, the lower areas are going in for the production of sub-tropical fruit like different verities of citrus, mango, litchi etc. The market for apples and other fruit like peach, plum, almond etc. is well established and market practices and standards well formulated, the situation is slightly different for sub-tropical fruits. One of the major limiting factors in this regards is competition from other states adjoining this zone, which have better agro-climatic

conditions for production of citrus fruit etc. and are advantageously located with respect to the market.

d. Objectives of the study

5. To collect data on area, production and yield of horticultural crops and compare with the baseline data collected by the Department of Horticulture, Revenue Department and Directorate of Economics and Statistics and so on.

6. To identify the horticultural crops on which proper statistics is not being compiled at present among the selected states.

7. To study the problems encountered by the grass-root officials while collecting the horticultural data.

8. To identify the problems in estimation of horticultural crops and to suggest policy measures.

e. Methodology and Data Source of the study

Both secondary and primary data was collected to achieve the objectives specified above. One Schedule for the Officials is prepared whereby district/block and village level officials were visited to collect information related to area, production and yield for the horticultural crops in Himachal Pradesh. The state agencies that collect data on horticultural crops belong to Departments of Horticulture and Agriculture, and Revenue (village accountant). Additional information was collected from the officials on methodology adopted, verification process carried out in collection of horticultural data and problems encountered by them in compilation of horticultural statistics. Information on area, production and yield of horticultural crops/crop groups was collected for the village and household level from the above mentioned state agencies.

After collecting information from the secondary sources, one village in each district growing highest area under each crop category (fruit/vegetable etc) was selected and complete enumeration was carried out in the village for those households who are growing horticultural crops. For this purpose, a Household level Schedule was prepared for the cultivators of horticultural crops.

In Himachal Pradesh district Shimla was selected for fruit and vegetable crops as this district has highest area under these crops in the state. Further, Theog block for vegetable crops and Jubbal block for fruit crops was selected on the basis of having highest area under these crops. The village Dharesh Gawech for vegetable crops in Theog block and village Dhali for fruit crops in Jubbal block were selected for complete enumeration.

The highest area under spice and flower crops was in the district Sirmaur. Thus, this district was selected for these crops. In this district, Paonta Sahib for spice crops and Rajgarh block for flower crops was selected on the basis of highest area under these crops. Further, village Sargaon for flower crops in Rajgarh block and village Toru-Bhaila for spice crops in Paonta Sahib block was selected for complete enumeration. The details of districts, blocks and villages selected for the crops under study are given in Table-1.1.

Table-1.1: Details of district, blocks, villages and crops selected for the study.

Particulars	Fruit crops	Vegetable crops	Flowers	Spices
District	Shimla	Shimla	Sirmaur	Sirmaur
Block	Jubbal/Kotkhai	Theog	Rajgarh	Paonta Sahib
Village	Dhali	Dharesh Gawech	Sargaon	Toru-Bhaila
Crop	Apple	Vegetables	Chrysanthemum	Ginger

In our primary survey, we have covered all the households growing horticultural crops and for a particular household, area, production and yield data was collected for all horticultural crops grown by the household during the reference year. This provide us estimates of household area, production and yield data as well aggregate area, production and yield of the selected village for the horticultural crops grown in the village during the reference year. Thereafter, a

verification exercise was carried out to match the household as well as village level data of the horticultural crops grown in the village obtained from the primary survey with the household and village level data provided by the state agencies.

A list of all the farm households growing the crops under study was prepared and data on demographic profile, area, production etc were collected through personal interview method on well designed schedule prepared for the purpose. The farm households were classified according to their size of land holding. The detail classification of farm households in the selected villages is given in Table-1.2.

Table-1.2: Classification of farm households in selected villages.

Crops	Marginal farms	Small farms	Medium farms	Large	All farms
Apple	45	14	4	-	63
Vegetables	64	25	19	6	114
Flowers	39	7	-	-	46
Ginger	57	26	22	6	111
All	205	72	45	12	334

The secondary data for the village/household level was collected from the state agencies such as block offices of horticulture and agriculture and from the records of village revenue official (Patwari) for the latest three years. The reference year for the primary survey is 2011-12 Agriculture year.

Chapter-II

GROWTH AND DEVELOPMENT OF HORTICULTURE CROPS IN THE STATE

The peculiar topography and agro-climatic conditions in most part of the state limit the scope for production of field crops, but the same offer most suitable conditions for cultivating horticultural crops. Horticulture in the state has now become a business proposition not only for orchardists but also for many others involved with the production and marketing of fruits and vegetables and various other ancillary occupations like transportation, carriage, suppliers of inputs etc. Horticultural industry in the state has developed as a business proposition since long back and has been witnessing continuous rise in area and production.

a. Area, production and Yield

According to Agriculture Department, Government of Himachal Pradesh, the area under various spice crops was 7.49 thousand hectares in 2007-08 that decreased to 7.10 thousand hectares in 2009-10. The production of spices was 143.70 thousand tonnes with average productivity of 1974 kilograms per hectare in the year of 2007-08 which increased to 152.55 thousand tonnes with yield of 2150 kilograms per hectare. The area under fruits was 67.53 thousand hectare in 2007-08 which increased to 382.24 thousand hectares in 2009-10. The production of fruits decreased from 712.85 thousand tonnes in 2007-08 to 382.24 thousand tonnes in 2009-10. It can be inferred from the table that the average yield of fruits has decreased to 484 kilograms per hectare in 2009-10 from 1056 kilograms per hectare in 2007-08. The area under vegetables was 35.76 thousand hectare in 2007-08 and decreased to 33 thousand hectare in 2008-09 and then increased to 35.67 thousand hectare in 2009-10. The production of vegetables was 1040.49 thousand tonnes with the yield of 2909 kilograms per hectare in 2007-08 this increased to 1206.24 thousand tonnes with the yield of 3381 kilograms in 2009-10. As far as flowers are concerned the area was 0.58 thousand hectares in 2007-08

which increased to 0.68 thousand hectare in 2007-10. Similarly the production also increases from 57159.78 thousand sticks in 2007-08 to 102953.86 thousand sticks in 2009-10. The yield also increased during this period from 98044 sticks per hectare to 150959 per hectare (Table 2.1).

Table- 2.1: Growth of Horticultural Crops in Himachal Pradesh.

Items	2007-08			2008-09			2009-10		
	A	P	Y	A	P	Y	A	P	Y
Spices	7.490	143.699	1919	7.423	146.531	1974	7.096	152.557	2150
Fruits	67.531	712.849	1056	74.448	628.076	844	79.024	382.237	484
Vegetables	35.764	1040.489	2909	33.014	1090.334	3303	35.672	1206.242	3381
Flowers	0.583	57159.778	98044	0.618	69690.778	112768	0.682	102953.875	150959

Note: Area in thousand hectares, Production in thousand M.Tonnes; Flowers in Nos. (Sticks), Yield in kg. /Ha.
Source: 1. Data related to Fruits and Flowers, Directorate of Horticulture, H.P.
2. Data related to Vegetables and Spices, Directorate of Agriculture, H.P.

District- wise Area, Production and Yield of Fruits

District wise area, production and yield of fruits have been presented in Table 2.2. The table shows that the area under fruits has increased in Bilaspur, Chamba, Kangra, Kinnaur, Kullu, Lahaul and Spiti, Mandi and Shimla districts during the period of 2007-08 to 2009-10. While, it decreased in remaining districts. It may be noticed from the table 2.2 that the production of fruits in all districts has decreased in 2009-10 as against of production of 2007-08 except in the Bilaspur district of where production has increased from 2339 tonnes in 2007-08 to 7579 tonnes in 2009-10. As far as yield is concerned, it registered decreasing trend. At the overall level the area under fruits increased from 67531 hectares in 2007-08 to 79024 hectares in 2009-10. The production was 712843 tonnes with the yield of 10556 kg. Per hectare in 2007-08 that decreased to 383110 tonnes and yield also decreased to 4848 kilograms per hectare in 2009-10.

Table- 2.2: District wise Area, Production and Yield of Fruits.

Districts	2007-08			2008-09			2009-10		
	A	P	Y	A	P	Y	A	P	Y
1.Bilaspur	359	2339	6515	348	4348	12494	459	7579	16512
2.Chamba	2035	9062	4453	2310	11081	4797	2551	5750	2254
3.Hamirpur	78	4437	56885	89	4548	51101	48	1642	34208
4.Kangra	6933	46109	6651	7271	48922	6728	9755	46069	4723
5.Kinnaur	4061	42047	10354	4971	55667	11198	5046	41290	8183
6.Kullu	6787	186491	27478	10776	89593	8314	9335	65959	7066
7.Lahaul Spiti	121	491	4058	115	590	5130	210	211	1005
8.Mandi	6765	38582	5703	6823	38326	5617	6944	14897	2145
9.Shimla	36779	354890	9649	38517	342294	8887	41577	181927	4376
10.Sirmour	1771	15438	8717	1443	16421	11380	1588	9154	5764
11.Solan	837	5400	6452	713	5957	8355	622	5395	8674
12.Una	1005	7557	7519	1073	10689	9962	889	6167	6937
H.P.State	67531	712843	10556	74448	628076	8436	79024	383110	4848

Note: Area in hectares, production in M.Tonnes; Yield in kg. /Ha.
Source: Directorate of Horticulture, Shimla, H.P.

District wise Area, Production and Yield of Vegetables

District wise area, production and yield of vegetables have been presented in table 2.3. The analysis shows that the area increased in two districts only viz. Lahaul & Spiti and Sirmaur where it was 2424 and 4072 hectares in 2007-08 and increased to 2626 and 4919 in 2009-10, respectively. Further, it was found that the area of vegetables in remaining ten districts decreased during the period of 2007-08 to 2009-10. Despite the decrease the area, production has increased in the all districts except Chamba where production decreased in 2009-10 in comparison to 2007-08. The yield also registered increasing trend accordingly. At the overall level the area increased marginally but both production and yield increased significantly during the period of 2007-08 to 2009-10.

Table-2.3: District wise Area, Production and Yield of Vegetables.

Districts	2007-08			2008-09			2009-10		
	A	P	Y	A	P	Y	A	P	Y
1.Bilaspur	593	51090	86155	471	57725	122558	563	58450	103819
2.Chamba	1290	40250	31202	1226	40164	32760	1345	46969	34921
3.Hamirpur	260	35740	137462	213	44958	211070	208	45463	218572
4.Kangra	2650	135859	51268	3004	144549	48119	3040	146565	48212
5.Kinnaur	457	34928	76429	158	38755	245285	418	41417	99084
6.Kullu	2269	81420	35884	2691	89520	33266	2988	93813	31397
7.Lahaul Spiti	2424	41052	16936	2386	43560	18250	2626	43920	16725
8.Mandi	5187	113340	21851	4787	109341	22841	4188	126063	30101
9.Shimla	11483	167322	14571	8008	173793	21702	11291	188128	16662
10.Sirmour	4072	128266	31500	4616	127588	27640	4919	150999	30697
11.Solan	3687	184737	50105	3811	193503	50775	3114	237255	76190
12.Una	1392	26485	19027	1643	26878	16359	972	27200	27984
H.P.State	35764	1040489	29093	33014	1090334	33026	35672	1206242	33815

Note: Area in hectares, production in M.Tonnes; Yield in kg. /Ha.
Source: Directorate of Agriculture, Shimla, H.P.

District wise Area, Production and Yield of Spices

The data of area, production and yield of spices has been presented in table 2.4. The table depict that the area increased in districts of Hamirpur, Kullu, Shimla and Solan in 2009-10 as against 2007-08. While in remaining districts it decreased during the same period. As far as production is concerned, it has show increasing trend in districts of Bilaspur, Kullu, Lahaul-Spiti, Mandi, Shimla, Solan and Una. Whereas in remaining districts it has decreasing trend during 2007-08 to 2009-10. It may also be seen from the table that the yield increased in the districts of Bilaspur, Kangra, Lahaul Spiti, Mandi, Shimla, Solan and Una, it decreased in remaining districts during the period of 2009-08 to 2009-10. At the state level the area decreased to 7096 hectares in 2009-10 from 7490 hectares in 2007-08. Despite decrease in the area both production and yield increased significantly during 2007-08 to 2009-10.

Table-2.4: District wise Area, Production and Yield of Spices

Districts	2007-08			2008-09			2009-10		
	A	P	Y	A	P	Y	A	P	Y
1.Bilaspur	204	6270	30735	200	7870	39350	166	6320	38072
2.Chamba	132	2401	18189	128	1275	9961	84	1367	16274
3.Hamirpur	78	11320	145128	72	7862	109194	82	8026	97878
4.Kangra	93	21240	228387	115	21112	183583	78	21140	271026
5.Kinnaur	45	681	15133	126	680	5397	80	833	10413
6.Kullu	666	9210	13829	406	10305	25382	875	10858	12409
7.Lahaul Spiti	5	52	10400	6	67	11167	6	67	11167
8.Mandi	780	12829	16447	940	13685	14559	620	15120	24387
9.Shimla	543	8892	16376	581	16176	27842	637	16885	26507
10.Sirmour	4442	49885	11230	4381	49302	11254	3963	47631	12019
11.Solan	453	16127	35600	444	13126	29563	470	19140	40723
12.Una	49	4792	97796	24	5071	211292	35	5170	147714
H.P.State	7490	143699	19185	7423	146531	19740	7096	152557	21499

Note: Area in hectares, production in M.Tonnes; Yield in kg. /Ha.
Source: Directorate of Agriculture, Shimla, H.P.

District wise Area, Production and Value of flowers

District wise area, Production and values of flowers from 2007-08 to 2009-10 have been presented in table 2.5. It is seen from the table that Sirmaur district has the highest area under flowers during 2009-10 followed by Kangra, Chamba and Bilaspur district. It is also observed that area increased in all flowers growing districts during 2007-08 to 2009-10. At the state level also the area increased from 583.44 hectares in 2007-08 to 681.86 hectare in 2009-10. It is clear from the table that production has also increased during the period of 2005-06 to 2009-10. The estimated value of flowers was Rs.1625 lakh in 2005-06 that increased to 4180 lakh in 2009-10.

Table- 2.5: District wise Area, estimated Production and estimated Value of Flowers.

(Rs. In thousand Lakh)

District	2007-08			2008-09			2009-10		
	Area	Prod.	Value	Area	Prod.	Value	Area	Prod.	Value
Bilaspur	9.12	893	0.035	13.53	1526	0.060	20.22	3053	0.124
Chamba	19.54	1914	0.075	21	2369	0.093	31.25	4714	0.192
Hamirpur	0.75	73	0.003	2.71	306	0.012	5.23	790	0.032
Kangra	79	7740	0.302	88	9929	0.389	91.42	13803	0.560
Kinnaur	19.10	1871	0.073	20.4	2302	0.090	29	4379	0.178
Kullu	0	0	0	0	0	0	0	0	0
L/Spiti	0.2	20	0.001	0.4	45	0.002	0.6	91	0.004
Mandi	5.44	533	0.021	12.15	1371	0.054	3.22	486	0.02
Shimla	22.14	2169	0.085	20.75	2341	0.092	27	4047	0.166
Sirmaur	379	37130	1.448	383.7	43294	1.696	405.55	61234	2.49
Solan	43.8	4291	0.167	51	5754	0.225	60	9059	0.368
Una	5.35	524	0.020	4.01	452	0.018	8.37	1264	0.051
Total	583.44	57160	0.223	617.65	69691	2.731	681.86	102954	4.18

Note: Area is in hectares, production is in thousand stems/sticks.
Source: Directorate of Horticulture, Shimla, H.P.

Year wise Area and Production of Horticulture Crops

Year wise area and production of horticulture crops has been presented in table 2.6. The table reveals that there were fluctuations in the area under spices, fruits and vegetables during the period of 2005-06 to 2009-10. Despite the fluctuations in the area of horticulture crops that has increased from 6164 to 7096hectares in spices, 6544686 to 79024 hectares in fruits, 34105 to 35672 hectares vegetables and 466.98 to 681.86 hectares in flowers during the reference period. As far as production is concerned there were fluctuations in the production of fruits, whereas the production of spices, vegetables and flowers has increased during 2005-06 to 2009-10.

Table-2.6: Year wise Area, Production of Horticulture crops in H.P.

Year	Spices		Fruits		Vegetables		Flowers	
	A	P	A	P	A	P	A	P
2005-06	6164	96711	654486	699517	34105	929976	466.98	43397390
2006-07	6459	129053	66004	369103	40313	1006247	509.82	53076152
2007-08	7490	143699	67531	712849	35764	1040489	583.44	57159778
2008-09	74448	146531	7423	628076	33014	1090334	617.65	69690778
2009-10	7096	152557	79024	382237	35672	1206242	681.86	102953875

Note: Area in hectares, production in M. Tonnes, Production of flowers is in number of sticks.
Source: 1. Directorate of Agriculture for the crops of Vegetables and Spices.
2. Directorate of Horticulture for the crops of Fruits and flowers.

b. Infrastructural facilities available for horticulture crops

In the growth of agriculture/horticultural commodities, infrastructure development is essential. In this context the state took a number of policy initiatives for the development of Infrastructural facilities relating to horticulture.

Production Facilities: The state has set up 113 nurseries for supply of fruit plants of different varieties, besides registering 736 private nurseries for this purpose. A network of 209 distribution centres under the control of Department of Horticulture, HPMC, Himachal Pradesh Agro-Industries Corporation and Himachal Pradesh Marketing Federation (HIMFED) supply the insecticides and pesticides to the farmers. The fertilizers are supplied from various outlets by the Primary Agricultural Cooperative Societies (PACS), department of agriculture and horticulture etc. under subsidized rates.

Disposal Facilities: Various measures have been taken in the state for augmenting the Infrastructural facilities for grading, packing, transportation, storage, processing, etc. In this regard the state has set up five cold storages with a capacity of 8,000 tonnes within the state and three cold storages outside Himachal Pradesh having a capacity of 8256 tonnes. At present there are four grading houses with a capacity of 15,000 tonnes and five grading-cum-packing houses having a capacity of 5,000 tonnes. Processing plants with a capacity of 40,000 tonnes have also been set up in the state.

Institutional Support: The HPMC was established in 1975 for providing facilities to orchardists. The main functions of this organization are to provide marketing advance in cash, packing material (cash/kind), forwarding assistance and transit warehouse, cold storage facilities and Market intelligence. Credit support is available under different schemes from the scheduled commercial banks, State Cooperative bank and Himachal Pradesh State Land development Bank etc.

The plastic crates are provided by the Directorate at the rate of about Rs. 80 per Kg (These are sold by weight) with 50 per cent subsidy for carrying the harvested vegetables. National Horticulture Research and Development Foundation, Karnal has been implementing a scheme for the development of certain vegetables in Himachal Pradesh. Its office is located in Kullu. In the state this scheme caters for garlic only and is operating in districts of Sirmaur, Kullu and Bilaspur. The scheme is being implemented in collaboration with Department of agriculture and has buy-back arrangement for the commodity being promoted.

Potato seed development stations: Potato Development Stations for multiplication of Breeder and Foundation Seed are located in every district of the state except Una, Kinnaur and Hamirpur. These are 17 in number with the total area of 165.205 hectares and cultivated area of 86.585 hectares. Major varieties of potato for which breeder and foundation seed is produced are Kufri Jyoti, K.GR, K. Chandermukhi., K. Chipsona I and II.

Vegetable development Stations: Five Vegetable Development Stations for Multiplication of Vegetable Seeds are located in district Chamba, Kangra and. The total area of these farms is 13.359 hectares with the cultivated area of 9.67 hectares. The vegetables for which breeder and foundation seed is produced are cabbage, capsicum, turnip, tomato, brinjal, cucumber, summer squash, pumpkin, bitter gourd, sponge gourd, chilies, beans, peas, ladyfinger, potato, cowpea, turmeric, paprika, toria, china sarson, brown sarson, gobhi sarson, radish, methi, spinach, onion, broccoli and cauliflower.

Ginger development Station: Two ginger development stations are located in district Sirmaur. The total area of these farms is 11.6 hectares. Himgiri is the major variety of ginger produced on these stations.

c. Schemes for the Development of Horticulture

The Horticulture Development Programmes undertaken by the Department in the State are discussed below:

Green Houses: A uniform subsidy at the rate about Rs. 90 per square meter is available for construction of polythene green houses subjected to the maximum size of green house limited to 10x4x2 meters.

Soil and Water Conservation: During 2003-04, 1500 tank irrigation schemes, 100 water harvesting schemes, 200 pump sets and 150 sprinkler irrigation schemes have been planned to be executed. A subsidy of 25% shall be provided to individual farmers for the purpose. An amount of Rs. 375 lakhs has been provided for this purpose. In addition to this 37 water shed development projects have been sanctioned covering an area of 20,821 hectares with an estimated cost of Rs. 12.88 crores. The major thrust of the programme is soil and water conservation and creation of on-farm employment. During this year, 191 minor irrigation schemes under RIDF will be completed at an estimated cost of Rs.8.50 crores. Additional irrigation potential of 2000hectares will be created during this year.

Packing Materials: In order to facilitate the marketing of fruits arrangements have been made to supply the packing material to the orchardists of state. The public sector Integrated Carton manufacturing factory at Pragati Nagar manufactured about 35.50 lakh telescopic cartons of 18-20 Kg. capacity, 0.20 lakh of 10 Kg. Kullu cartons and 0.36 lakh of four Kg. almond cartons. In addition to this about 54 lakh cartons of various capacities were procured from HPMC, Himfed etc. and distributed to fruit growers. About 10 lakh eucalyptus carton were imported from outside the state by various beneficiaries.

Fruit Marketing and Market Intervention (MIS) Scheme: The government of Himachal Pradesh established Himachal Pradesh Horticultural Produce Processing and marketing Corporation Ltd (HPMC) for facilitating the marketing of fresh fruits and vegetables and to process the un-marketed quantities or processing grade fruits. Ever since its formation, the HPMC has been playing an important role by ensuring the remunerative prices for the orchardists of the state.

Horticultural Diversification: With the aim of diversifying horticultural sector of the state, till March 2004, a total of 311 hectare of area was brought under floriculture and 48 flower growers' cooperative were functioning to facilitate the marketing of small quantities of flowers produced by individual producers. The ancillary horticultural activities like mushroom cultivation and apiculture are also being promoted. The apiculture is of special importance for the horticulture sector as the honey bees improve the pollination having significant impact on the fruit productivities.

Quality Improvement: The state government has been importing virus free colonel root stock for different fruits for improvement in quality and production. During 2003-04 about 55,000various colonel root stock of apple, cherry, pear etc were imported and distributed among the orchardists.

Horticulture Technology Mission: The Horticulture Technology mission has been initiated in the state with a budget of Rs. 80 crores in order to establish convergence and synergy among various ongoing government activities in the state.

Vegetables Development Project: Annually about 6.25 lac tonnes of fresh vegetables are produced. Intensification is done through project approach. Presently 100 projects with an area 1,000 hectares have been taken up .The Department own four Vegetable Seed Farms where Quality Seed is produced.

Ginger Development: For productions of disease free Ginger, the Department is providing Training, Demonstrations and Quality Seed. Annually about 35,000 tones of Green Ginger is produced which is marketed to the neighbouring States.

Agricultural Marketing: This is regulated in the State through H.P Agricultural Produce Market Act 1969. Under this Act H.P Marketing Board has been set up. At present, 10 Market Committees are functioning so far 29 are Functional Agricultural Markets and 7 numbers are under construction.

Farmers Trainings & Education: The Department runs two Training Centers one at, Mashobra, District Shimla and other at Sundernagar, District Mandi. Besides this farmers training camps are organized at Village, Block and District level.

d. Plan Investment in Horticulture

All the programmes for development of horticulture sector in Himachal Pradesh run through the department of Horticulture and Agriculture. The horticulture department deals with the programmes related to the fruits crop, flower and mushroom etc. The department of agriculture deals the programmes related with vegetables and spices in the state. As far as the plan investment in horticulture sector is concerned, the investment has been divided among various schemes/activities. Scheme wise investment in this sector has been presented in table 2.7. It is seen from the table that the investment in all the schemes decreased from 932.79 lakh rupees in 2007-08 to 544.21 lakh rupees in 2012-13. Scheme wise investment also decreased in almost all the schemes except for plant protection, development of floriculture and development of mushroom cultivations, during the period of 2007-08 to 2012-13. The investment in horticulture sector has also been done under horticulture technology mission in the state. Under this mission also the investment in fruits and flowers decreased from Rs.162.47 lakh in 2007-08 to Rs.138.66 lakh in 2009-10 (Table 2.8).

Table- 2.7: Investment in Horticulture Sector from 2007-08 to 2012-13.

(Actual Expenditure Rs. in lakh)

Name of the Scheme	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1.Estt. of govt. Orchards and Nurseries	116.63	107.99	104.33	95.13	72.72	71.01
2.Plant Nutrition Programme	10.02	13.52	19.7	7.89	6.12	5.01
3.Plant protection scheme	11.32	17.44	9.88	8.25	14.77	12.98
4.Hort. Development Scheme	720.53	312.82	342.91	444.43	309.13	369.1
5.Development of Apiculture Scheme	10.39	9.95	8.47	10.06	12.08	9.71
6.Development of Floriculture scheme	11.16	15.59	16.89	16.26	15.17	19.57
7.Dev. of Mushroom cultivation	19.67	24.56	29.63	31.23	30.27	31.42
8.Fruit processing units	33.07	34.73	23.98	32.76	35.85	25.41
Total	932.79	536.6	555.79	646.01	495.66	544.21

Source: Directorate of Horticulture, Shimla, H.P.

Table- 2.8: Investment in Horticulture Sector Under H.T.M. from 2007-08 to 2009-10

Particulars	2007-08	2008-09	2009-10
Fruits	131.07	338.06	116.56
Flowers	31.4	13.09	22.1
Total	162.47	351.15	138.66

Source: Directorate of Horticulture, Shimla, H.P.

As investment on spices and vegetables is concerned the department of agriculture is implementing Ginger development scheme in Sirmaur district. In addition to it, promotion of vegetables is taken care of by the department under commercial crops. The detail of actual expenditure incurred from 2007-08 to 2010-11 is presented in Table 2.9. It was also clarified by the department that the crop wise information on actual expenditure incurred is not available with the department as the information is compiled for scheme as a whole. Further table reveals that the expenditure on spices was Rs.93.68 thousand in 2007-08 that increased to Rs.400.00 thousand in 2010-11. On the other hand, the expenditure on vegetables has decreased from Rs.79.93 lakh in 2007-08 to Rs.8.98 lakh in 2010-11.

Table-2.9: Crop category wise investments in horticulture sector by Agriculture Department during 2007-08 to 2010-11.

Crop Category	Investment in the year (actual expenditure in Rs.)			
	2007-08	2008-09	2009-10	2010-11
1.Spices (Ginger Development Scheme)	93,683	99,977	-	4,00,000
2.Vegetables (Commercial crops)	79,93,293	79,53,618	52,75,555	8,97,955

Source: Directorate of Agriculture, Shimla, H.P.

e. Problems of Horticulture Crops

Production Problems: Constraints in Horticulture Sector are poor quality planting material including seed and root stocks; poor layout of orchards; lack of appropriate polynizer in the orchard, lack of proper training and pruning of the fruit trees; inadequate plant nutrition and organic matters; lack adequate use of plant protection materials; poor overall management of orchards. Post harvest quality controls almost non-existent resulting in considerable wastage

and damage. Absence of pre cooling and cold storage is major problems for horticultural produce. Processing facilities are limited. At present only about 4 per cent of fruits and vegetables are being processed in the state.

Post Harvest Handling, Marketing and Processing: Post harvest quality controls almost non-existent resulting in considerable wastage and damage. The post harvest losses at farmer's and trader's level are 24 per cent in apples, 25 per cent in mango, 18 per cent in peach and 24 per cent in citrus. The markets for horticultural produce are outside the state. About 70 per cent of the production of horticultural crops is being sold outside the state for which farmers incurred large amount of money in marketing. The producer's share in consumer price ranges between 34 per cent in citrus fruits to 49 per cent in apples. Absence of pre cooling and cold storage is major problems for horticultural produce. Processing facilities are limited (66.5 tonnes/annum capacity). At present only about 4 per cent of fruits and vegetables are being processed in the state.

Small Landholding Size: The landholding size of marginal commercial farmers is very small. Although, there are no separate estimates available for the average holding size for commercial farmers, the average holding size of marginal category of farmers in the state can be used as proxy and this figure is only 0.4 ha. This size cannot be considered economical viable by any standard. The fact that all the landholding is not under plough is also to be kept in mind while analyzing this factor. Simultaneously, the land is fragmented and a single farmer has number of land parcels making it difficult to manage and cultivate even this small holding.

Irrigation: Irrigation is one of the most crucial inputs determining the productivity and hence the economic feasibility of the commercial ventures like fruit and vegetable cultivation. This is more crucial for vegetable cultivation; it is becoming increasingly important for the fruit cultivation as well especially in low hill region and with changing climate and erratic rains. The irrigated area in the state, till today, remains as low as 18 per cent. The lack of irrigation is therefore, an important contributing factor to vulnerability to food insecurity in the state.

Global Warming: There has been a general rise in atmospheric temperature disturbing the crop cycle of many crops. In case of apple this effect is being increasingly felt. Apple plantation requires certain minimum chilling period. The ultimate result has been the

substantial reduction in productivities. The higher temperature also results in increased incidence of insects and pests having adverse impact on quality of fruit. The apple area in Rajgarh block of district Sirmaur has now receded to higher reaches due to higher temperature and decreasing chilling days required for apple production. The orchardists due to declining yields which reached the uneconomic levels had no other option but to convert the apple orchards to peach orchards.

Erratic Rains: Along with warming of atmosphere there has been a change in the rainfall pattern. This again has led to adverse impact on both plantation and field crops. There is need of rainfall during the flowering stage in apple plantations but changing rainfall pattern has deprived the orchards of required moisture resulting in poor fruit setting. The situation in Karsog block of district Mandi became so desperate that the trend of selling of the orchard started about eight years ago. This only stopped during last two years when there were some rains during the flowering period and normal productivity was ensured. One of the contributing reasons along with erratic rains was that the plantations are situated on low heights where the moisture is not retained by soil, making timely rainfall more important in absence of any source of irrigation.

Adverse Market Situation: The prices of fruit and vegetables have not been keeping pace with the input prices and transportation costs tilting the balance against the farmers. The farmers are exploited in the markets due to malpractices adopted by the middleman. The problem with vegetable growers is that these are being marketed is cities of neighboring states where even a small oversupply leads to price crash.

Inaccessibility to Extension Services: The raising and maintenance of commercial agriculture, be it plantation crops or field crops like vegetables, is highly technical job. This needs continuous up-gradation of production and marketing skills which is only possible through regular extension by government agencies or other institutions like research centers or universities. This crucial facility has been observed to be grossly inadequate in the state making the present production and marketing techniques obsolete. The marginal farmers are the main sufferers in this respect. The large category of farmers is in touch with department of horticulture or agriculture for keeping themselves abreast of latest recommendations which the marginal farmers can ill afford.

Labour Shortage: The commercial agriculture is highly labour intensive venture. There is perpetual shortage of labour even on marginal and small farms and that is why the Nepali migrant labour finds ready employment here.

WTO and Opening up of Indian Market for International Agricultural Trade: An apprehension about the increasing quantity and continuously falling price differentials of imported fruits/vegetables and flowers in comparison to domestic produce is being increasingly felt among the farmers. The vegetable farmers have to face the competition from other states whereas the fruit producers may have to face stiff competition from other countries like China, Australia and New Zealand etc.

Declining Secondary Assets: The most important secondary source of income for the farmers of the state is livestock. With the increase in the area under horticulture there has been a sea change in the livestock composition of the orchardists. Due to declining grazing land and with commercialization the reduction in the availability of crop residue to be used as fodder, increasing number of farmers are now opting for only one or at the most two cross-bred cows whose milk is mainly used for domestic consumption. The surplus milk has to be processed in absence of markets especially in the interior areas. Simultaneously, there is a decline in off-farm employment opportunities due to increasing mechanization in this respect. The marginal farmers find work on the farms of big land owners, but in this also they have to face competition from the migrant Nepali labour. Many times the Nepali labour is preferred to local as they are hard working and their stout physique allows them to do such manual unskilled labour which is not possible for the locals to do. Contrary to this, the local labour is preferred for skilled jobs like pruning, spraying, picking of fruit, grading and packing etc.

Extension of Commercial Agriculture to Marginal Lands: Lured by comparatively higher profitability the commercial agriculture is being practiced on marginal lands. This has resulted in not only the poor quality of product but also the productivity is low. It is difficult to market such quality of fruits or vegetables. The cost of production on the marginal lands is higher as the input use is higher for compensating the poor quality of land and simultaneously the prices received are low. The squeeze in profit margins is increasing day by day.

Spurious Inputs: The spread of commercialization has made the business of inputs supply a lucrative preposition. In order to further increase the profitability, the inputs like insecticides or pesticides are found to be many times spurious or having less than claimed potency. Seeds are also found to be of other than intended variety and same is the case with the fruit saplings.

Rhizome rot is the major disease of ginger crop. This disease was prevalent in most of the ginger growing areas and had taken heavy toll on the ginger production. Frequent occurrence of rhizome rot disease, high labour and capital requirement are the reasons for decreasing area under ginger. None or partial adoption of scientific production techniques has been found to be major reason for lower ginger productivity. The improved ginger technology is available but the ginger growers either did not make use of it or deviated from the improved practices owing to their misconceptions. The technological gap in case of insecticides and fungicides was found to a very high. This gap was most critical in the light of the damage caused by the rhizome rot disease. Non-availability of healthy and quality ginger seed in adequate quantity at sowing time compel farmers for using lower seed rate which mainly decreased the yield. Traditional ginger storage techniques were proving inadequate and many farmers reported loss of substantial quantity of seed during storage.

f. Summing Up

The analysis reveals that the area has increased significantly under fruits and flowers from 67.531 thousand hectares in 2007-08 to 79.024 thousand hectares and 0.583 thousand hectares in 2007-08 to 0.682 thousand hectares in 2009-10 respectively. Whereas the area of spices was almost same during this period. The area of vegetables has slightly decreased from 35.764 thousand hectares to 35.672 thousand hectares during the period of study. As far as yield is concerned that yield of spices vegetables and flowers has increased significantly. Whereas yield of fruits has decreased during the period of study.

Shimla district alone accounts for 43 per cent of area and 48 per cent of total production in the state in 2009-10. It is also concluded that area and production of all fruits has been continuously increasing in the state and in the opinion of many experts a stage has been reached where horticulture sector is being extended to marginal lands. This is having negative impact on productivity and profitability of horticulture sector. It is being advocated that policy

should increasingly cater to productivity enhancement rather than on increasing area. The area of various vegetables in the state during the year 2009-10 is 35672 hectares. Shimla district ranked first in area under vegetables followed by Sirmaur in the State. It is concluded that the productivity of vegetables was higher in Hamirpur district followed by Bilaspur. The area under flowers has increased from 583 hectares to 682 hectares. The district Sirmaur has highest area under flowers, followed by Kangra and Solan. The share of Sirmaur district in total area of flowers is 59 percent during 2009-10 year. Ginger is cultivated in all districts of the state excluding Kinnaur and Lahaul- Spiti. The district Sirmaur, Solan and Bilaspur are the major areas for producing quality ginger. Poor quality planting material including seed and root stocks; poor layout of orchards; lack of appropriate polynizer in the orchard, lack of proper training and pruning of the fruit trees; inadequate plant nutrition and organic matters; lack adequate use of plant protection materials; poor overall management of orchards are the major problems in horticultural crops. Post harvest quality controls almost non-existent resulting in considerable wastage and damage. The goals of planning in Himachal Pradesh, clearly shows that the planners in Himachal Pradesh have, by and large, followed the framework and objectives of the National Plan and have thus failed to give the much-needed regional focus for planned development in the context of the distinct physical features and environmental conditions of the State.

Chapter – III

SOCIO-ECONOMIC CONDITIONS OF THE HORTICULTURE CROP GROWERS

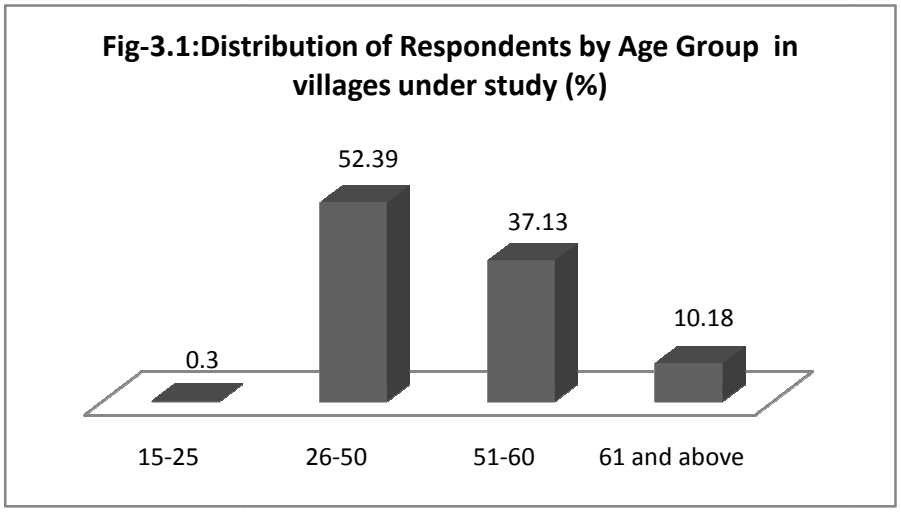
Knowledge of socio-economic structure of the study area is important as it helps in understanding the background of the area and gives an idea of the conditions under which the farmers have been operating.

a. Background of the Respondents and the Households

The background of the respondents and the households is divided into: age group, their education level, caste, religion and distance of the village from the market.

Age Group

The distribution of respondents in different groups by age wise is given in Table 3.1. It can be seen from the table that in the case of fruit, vegetable and flower growers, most of the respondents were in the age group of 26-50 years. The percentage of these growers in this age group was 41, 57 and 63 percent respectively. While in the case of spice growers the percentage of respondents was almost same i.e. about 50 per cent in each of the age groups of 26-50 and 51-60 years. Overall, out of total 334 growers most of (52.39%) were in the age group of 26-50 years followed by 37 per cent in the age group of 51-60 years (See Fig.3.1).



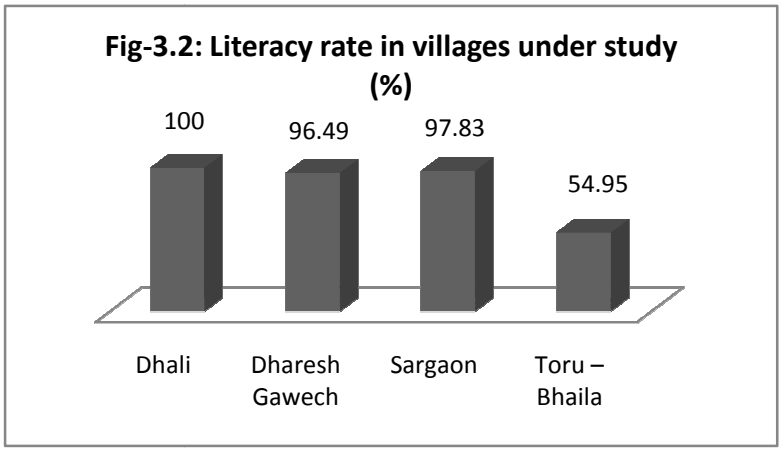
The age wise distribution of family members of the surveyed households is given in Table 3.2. In the case of fruit (apple) growers, out of total family members of 377 of 63 households, 40 per cent are males, 39 percent females and 21.22 percent children (below 15 years). The data of vegetable growing families shows that out of total family members of 761 of 114 households, 36 per cent are males, 35 per cent females and 29 percent are children (below 15 years). As far as flower (chrysanthemum) growers are concerned, the percentage of children is more (37%) as compared to males and females i.e. 32 and 31 per cent respectively. In the case of spice (ginger) growers, the percentage of males is more (38.44%) as compare to females (33.33%) and 28.23 percent of the total family members are children.

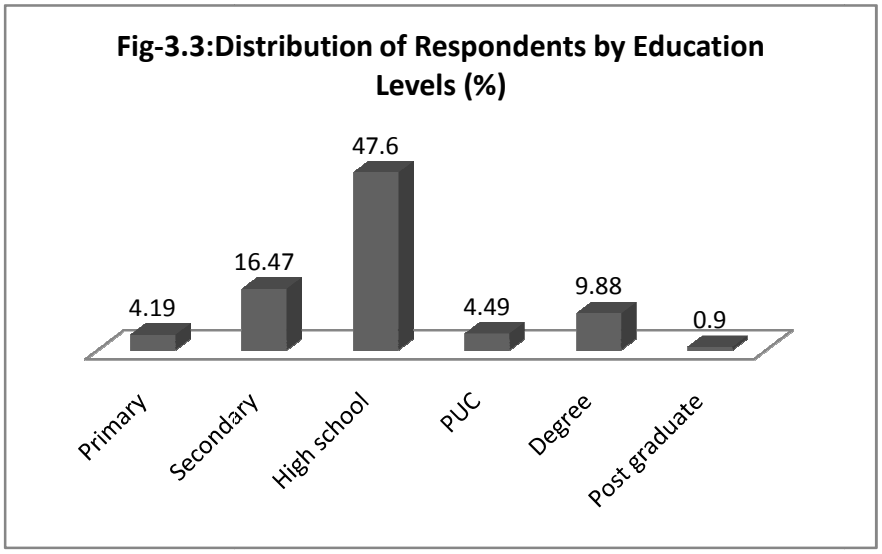
Education Level

For any economic activity, education is required for the development of confidence and habit of scientific thinking and action for solving emerging problems. For these purposes, appropriate education at all levels is important. Such education is equally important even for adults on their farm and in village in every activity. Keeping in view the importance of education, the level of education of respondents was worked out and presented in Table 3.3. In the case of fruit growers, 46 per cent of the respondents had education up to high school level, 19 percent respondents completed 3 years degree course and 17.46 per cent of the respondents had education up-to PUC level. There was no illiterate person found in the category of fruit growers. As far as the category of vegetable growers is concerned, 3.51 percent of the total respondents were illiterate (Fig.3.2). The highest percentage (47.37) of the respondents had education up-to high school level and about 22 and 10 percent up-to secondary and primary level respectively. In the case of flower growers also the highest percentage (56.52) of the respondents had education up to high school level. In spice growers category, 45 percent respondents were found to be illiterate and the same is the percentage of the respondents whose qualification is up-to high school level. Overall, 48 percent of the respondents were educated up to high school level and 16.47 percent were found to be illiterate (Fig.3.3).

The distribution of highest educated person in total surveyed households is given in Table 3.4. The table shows that in the category of fruit growing households, the qualification of highly qualified persons in 55.55 percent households is up to secondary level, followed by graduate & above (48.26%) and technical (only 1.59%) . Similarly the data of vegetable growers indicates

that the highest educated persons in 69 percent households is up to secondary level followed by graduate & above (28%) and primary level (2.63%). As far as floriculture is concerned, the highly qualified persons in 78 percent households are also up to secondary level, and in 17.39 per cent households are graduate & above. In the case of spice growers, in 92 percent households the highest educated persons are qualified up to secondary level and in 7.21 percent household, there was no educated person.





Caste

The distribution of respondents by caste is given in Table 3.5. The table shows that most of the households, in surveyed villages, fall in the general category and few households belong to scheduled castes and other backward castes. In the case of fruit, vegetable and spice growers 89, 84 and 78 percent respondents belong to general category respectively while 11,

16 and 22 percent respondents belong to scheduled caste category. As far as floriculture is concerned, 54 percent of the respondents belong to general category, about 22 per cent to schedule caste category, and only 6.52 per cent to OBC category.

Religion

It was found during the survey that the religion of all the families is Hindu (Table 3.6) in all the categories of fruit, vegetable, flower and spice growers.

Distance of the Village from Nearest Main Market

The distance between the village and nearest main market is an important aspect as it involves cost of bringing the inputs from the market and carrying farm produce from village to the market. Table 3.7 shows that the distance of the fruit growing sampled village from nearest main market was 65 kms, whereas the distance of vegetable growing village from nearest main market was only 10 kms. The distance of the flower growing village from nearest main market was about 450 kms (Delhi), whereas this distance was 35 kms in the case of spice growers.

b. Land Ownership Detail / Cropping Pattern

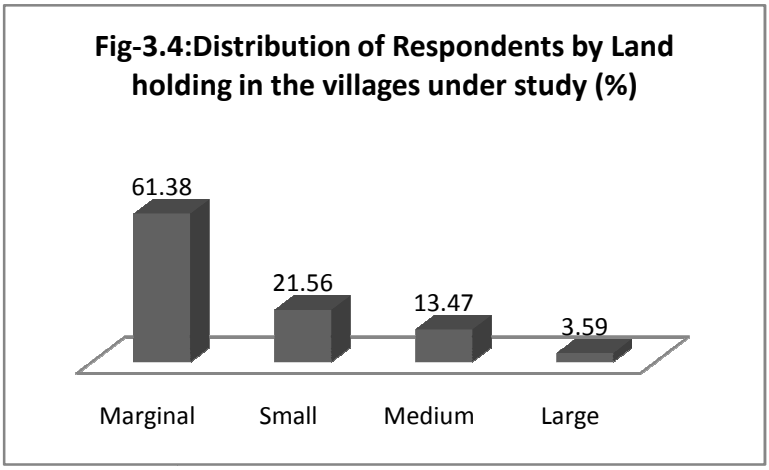
The land ownership detail and cropping pattern of households in case of fruit, vegetable, flower and spice growers is discussed below.

Land Size Classification

The classification of the surveyed households on the basis of their land holdings has been presented in Table 3.9. The surveyed households were divided in four categories viz.

1. Marginal farm households having land up to 1 hectare
2. Small farm households having land 1-2 hectares
3. Medium farm households having land 2-4 hectares
4. Large farm households having land above 4 hectares

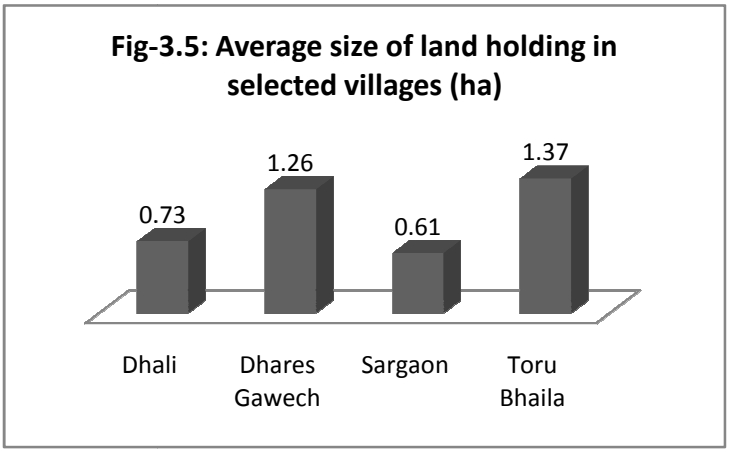
Table 3.9 shows that majority of the respondents, in the surveyed villages are small and marginal farmers. The data indicates that in the case of fruit growers, 71.43 per cent farmers belong to marginal category, 22.22 per cent small and only 6 per cent farmers belong to medium category. The data of vegetable growers shows that 56, 22, 17 and 5 per cent respondents belong to marginal, small, medium and large categories respectively. As far as flower growers are concerned about 85 per cent respondents are in the category of marginal farmers. In the case of spice growers, 51, 23, 20 and 5 per cent respondents belong to marginal, small, medium and large categories respectively.



Land Owned by the Households

The land owned by the households in case of fruit, vegetable, flower and spice growers is given in Table 3.10. The total land holding of the surveyed households in all the categories of growers is not fully cultivated. In the case of fruit growing village 92.52 per cent land is under cultivation and the rest is un-cultivated land. Further in this case entire land is un-irrigated. The data of vegetable growing village indicates that 43.44 per cent is the net operated and rest is the un-cultivated land. Only 6 per cent area is found to be irrigated and rest is un-irrigated in this case. As far as the floriculture is concerned 89.20 per cent is the net operated land. Most (89%) of the land is under irrigation in this village. The total owned area of spice growers is 151.75 hectares, out of which 55.24 per cent is the net operated area and 28 per cent is under irrigation. The proportion of land under irrigation was relatively higher in the category of flower growers as compared to other categories. The leased-in and leased out-land system is not operating in any category of surveyed households (Table 3.11). Overall, the average size of

holding comes out to be 1.11 hectares. The average size of holding is maximum in the category of spice growers (1.37 ha.), followed by vegetable growers (1.26 ha.) fruit growers (0.73 ha.) and flower growers (0.61 ha.) (see Table 3.10 & Fig. 3.5).



Distribution of Irrigated Area by Source

Table 3.12 shows that tank is the only sources of irrigation in vegetable and flower growing villages whereas in the case of spice growing village farmers irrigated crops through IPH *Kuhls*.

The year of starting cultivation of different horticultural crops in the villages under study has been given in Table 3.13. It is observed that all the surveyed farmers had started to grow the horticulture crop since long i.e. more than 10 years back.

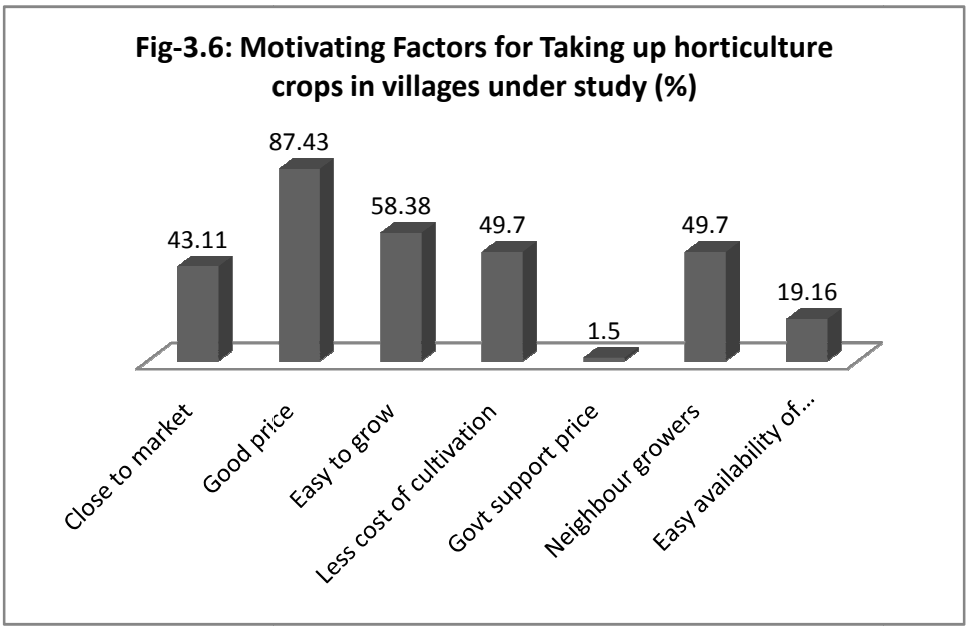
Cropping Pattern of Selected Districts

The cropping pattern of districts Shimla and Sirmaur has been presented in Table 3.14. The table reveals that the total gross cropped area (GCA) of Shimla district was 86878 hectares in 2009-10. Out of total GCA, 48 percent area was under fruits followed by cereals and millets 31 percent, vegetables 13 percent and pulses about 7 percent. There was marginal area under sugarcane, spices and oilseeds crops. Further it may be seen from the table that there was no area under fodder crops and non food crops in this district. The gross cropped area (GCA) of Sirmaur district was 74089 hectares in the same year. The area under cereals and millets was highest (75 percent) followed by vegetables (about 7 per cent), spices (5.35 percent) and

pulses (5 percent). It is also revealed from the table that the area under fodder crops and other non food crops was 2.87 and 0.21 percent respectively.

c. Motivating Factors for Cultivation of Horticultural Crops

The motivating factors for cultivation of horticulture crops are given in Table 3.15. The motivating factors as revealed by the growers are multiple in response. In the case of fruit growers majority (95%) of the respondents reported that 'good price' is the motivating factor for taking up horticulture crops, followed by 'easy to grow' (78%), 'less cultivation cost' (63%) and 'neighbour grows' (28.57%). About 75 per cent vegetable growers stated that 'good price' is the motivating factor, followed by the factor 'easy to grow' (58.77%), 'neighbour grows' (59.65%), 'less cultivation cost' (57%), 'close to market' (44.74%) and 'easy availability of seed/nursery' (37.72%). As far as flower growers are concerned they reported that 'good price', 'easy to grow', 'less cultivation cost' are the main motivating factors for cultivation of flowers. In the case of spice farmers 97 per cent growers were of the view that 'good price' is the main motivating factor followed by the factor 'close to market' (77%) and 'neighbour grows' (54%). Thus, in all the categories 'good price' remained the main motivating factor (Fig. 3.6).



Preference-wise Motivating Factors for Taking up Horticulture Crops

The rankings (first, second, third) of all the motivating factors are presented in Table 3.16. Similar to the Table 19, the factor 'good price' is ranked first by 60 per cent respondents, second by 25 per cent and third by less than 10 per cent. The factors 'close to market', easy availability and less input cost are ranked first by only 1.59 percent respondents. The factors 'less input cost' and 'easy to grow' also remained main factors as these were ranked second by 57 to 58 percent respondents. Hence it can be observed from this table that as far as fruit growers are concerned, good price is main factor for taking up fruit cultivation followed by 'less input cost' and 'easy to grow' at second place.

As in the case of fruit growers, 'good price' again remain first motivating factor for most of the vegetable growers. But in this case, the percentage of growers preferring it first is less in comparison to that of fruit growers (i.e. from 60% to 40%). Again 'easy to grow' is the second main motivating factor for vegetable growers as about 32 per cent respondents ranked it second.

For 67 percent growers of floriculture crop, 'good price' is the first and hence main motivating factor to grow flowers. As there is no nearest market for selling this crop, 'close to market' is no consideration to motivate them to grow this crop. The second motivating factor to adopt floriculture is 'easy to grow' as 78 per cent respondents ranked it second.

The factors 'close to market' and 'good price' are main motivating factors for cultivation of spices since almost same number of respondents ranked these at the first place. Still if these factors are compared at second place, 'good price' is ranked second by large number of respondents. Hence, 'good price' is again main motivating factor in this case too, placing it as the main motivating factor for adopting horticulture. The 'Govt. support' is not a motivating factor in any of these crops.

d. Summing Up

It may be concluded from the above analysis that out of total surveyed households, majority of the respondents were in the age group of 26.50 years, followed by 37 per cent in the age group of 51-60 years. The percentage of males in the total population was relatively more as

compare to females and 28 percent of the total family members were children. The maximum respondents were illiterate in the case of spice growing households and all persons were literate in the case of fruit growing households. Forty eight percent of the respondents were educated up-to high school level and 16 percent were illiterate in all the categories of households. The highest educated persons in most of the households were up to secondary level. The majority of the farm households, in village under study, fall in the general category and few households belong to scheduled castes and other backward castes. The religion of all the families is Hindu. The distance of the village from the nearest main market was maximum in the case of floriculture and minimum for the vegetable growing village.

In the surveyed areas 61, 22, 13 and 4 per cent growers belong to marginal, small, medium and large categories respectively. The total land holding of the surveyed households in all the categories was not fully cultivated. The proportion of land under irrigation was relatively higher in the flower grower village as compare to other villages under study. The leased in and leased out system of land was non-existent in the village under study. The average size of holding was (1.37 ha.) in the case of spice growers and (0.61 ha.) in the case of flower growers.

The result of cropping pattern reveals that the total gross cropped area (GCA) of Shimla district was 86878 hectares in 2009-10. Out of total GCA, 48 percent area was under fruits followed by cereals and millets 31 percent, vegetables 13 percent and pulses about 7 percent. There was marginal area under sugarcane, spices and oilseeds crops. Further it may be seen from the table that there was no area under fodder crops and non food crops in this district. The gross cropped area (GCA) of Sirmaur district was 74089 hectares in the same year. The area under cereals and millets was highest (75 percent) followed by vegetables (about 7 per cent), spices (5.35 percent) and pulses (5 percent). It is also revealed from the table that the area under fodder crops and other non food crops was 2.87 and 0.21 percent respectively.

All the surveyed growers had started to grow the horticulture crops more than 10 years back. In all the categories ‘good price’, which is first in ranking, remained the main motivating factor for taking up horticulture crop. The Govt. support’ is not a motivating factor in any of these crops.

Table-3.1: Distribution of Respondents by Age Group

(Percentage)

Name of the Village	Below 14	15-25	26-50	51-60	61 and above	Total	Total (No.)
Dhali-(Fruits)	-	1.59	41.27	38.09	19.05	100.0	63
Dharesh Gawech-(Vegetables)	-	-	57.02	31.58	11.40	100.0	114
Sargaon-(Flowers)	-	-	63.04	17.39	19.57	100.0	46
Toru -Bhaila -(Spices)	-	-	49.55	50.45	-	100.0	111
Total	-	0.30	52.39	37.13	10.18	100.0	334

Table-3.2: Distribution of Family Members by Age Group

(Percentage)

Name of the Village	Male		Female		Children below 15 Years (boys and Girls)	Total	Total (No.)
	Below 15 Years	Above 15 Years	Below 15 Years	Above 15 Years			
Dhali	-	40.05	-	38.73	21.22	100.0	377
Dharesh Gawech	-	36.40	-	34.82	28.78	100.0	761
Sargaon	-	31.83	-	31.09	37.08	100.0	267
Toru –Bhaila (Spices)	-	38.44	-	33.33	28.23	100.0	705
Total	-	37.16	-	34.35	28.29	100.0	2110

Table-3.3: Distribution of Respondents by Education Levels

(Percentage)

Name of the Village	Primary Up to 4 Std	Secondary 5-7 std	High School 8-10 std	PUC 11-12 std	Degree 3 Years	Diploma	Post Graduation	Degree-Engineering / Medical	Illiterate	Total	Total No.
Dhali	1.59	11.11	46.03	17.46	19.05	-	4.76	-	-	100.0	63
Dharesh Gawech	9.65	21.93	47.37	1.75	15.79	-	-	-	3.51	100.0	114
Sargaon	4.35	26.09	56.52	4.35	6.52	-	-	-	2.17	100.0	46
Toru – Bhaila (Spices)	-	9.91	45.05	-	-	-	-	-	45.05	100.0	111
Total	4.19	16.47	47.60	4.49	9.88	-	0.90	-	16.47	100.0	334

Table-3.4: Distribution of Highest Educated Person in the Sample Households

(Percentage)

Name of the Village	Below Primary	Primary	Secondary	Graduate & Above	Technical	Illiterate	Total	Total No.
Dhali	-	-	55.55	42.86	1.59	-	100.0	63
Dharesh Gawech	-	2.63	69.30	28.07	-	-	100.0	114
Sargaon	-	4.35	78.26	17.39	-	-	100.0	46
Toru –Bhaila (Spices)	-	-	92.79	-	-	7.21	100.0	111

Table-3.5: Distribution of Respondents by Caste

(Percentage)

Name of the District/Block/Village	SC	ST	OBC	Gen	Others	Total	Total (No.)
Dhali	11.11	-	-	88.89	-	100.0	63
Dharesh Gawech	15.79	-	-	84.21	-	100.0	114
Sargaon	39.13	-	6.52	54.35	-	100.0	46
Toru –Bhaila (Spices)	21.62	-	-	78.38	-	100.0	111
Total	20.06	-	0.90	79.04	-	100.0	334

Table-3.6: Distribution of Respondents by Religion

(Percentage)

Name of the Village	Hindu	Muslim	Christ	Buddhist	Jain	Total	Total (No.)
Dhali	100.0	-	-	-	-	100.0	63
Dharesh Gawech	100.0	-	-	-	-	100.0	114
Sargaon	100.0	-	-	-	-	100.0	46
Toru – Bhaila (Spices)	100.0	-	-	-	-	100.0	111
Total	100.0	-	-	-	-	100.0	334

Table-3.7: Distance between Village and the Nearest Main Market

Name of the Village	0-10 kms	11-20 kms	21-30 kms	31-40 kms	Above 40 kms	Average Kms
Dhali	-	-	-	-	65	-
Dharesh Gawech	10	-	-	-	-	-
Sargaon	-	-	-	-	450	-
Toru –Bhaila (Spices)	-	-	-	35	-	-

Table-3.8: Total number of Earning Members in the Sample Households

Name of the Village	Total Members	Earning Members	Total Annual Family Income
Dhali	-	-	-
/Dharesh Gawech	-	-	-
Sargaon	-	-	-
Toru –Bhaila (Spices)	-	-	-
Total			-

Table-3.9: Distribution of Respondents by Land Size Classification

(Percentage)

Name of the Village	Marginal	Small	Medium	Large	Total	Total (No.)
Dhali	71.43	22.22	6.35	-	100.0	63
Dharesh Gawech	56.14	21.93	16.67	5.26	100.0	114
Sargaon	84.78	15.22	-	-	100.0	46
Toru – Bhaila (Spices)	51.35	23.42	19.82	5.41	100.0	111
Total	61.38	21.56	13.47	3.59	100.0	334

Table-3.10: Land Owned by the Households

(Percentage)

Name of the Village	Unirrigated or Dry Land	Irrigated	Total Land (Ha.)	Leased in	Lease d out	Uncultivated Land	Total (Own and Leased in Land) Ha.	Net operated Area [7-(5+6)]	Average size of holding (Ha.)
	1	2	3	4	5	6	7	8	9
Dhali	100.00	-	46.23	-	-	7.48	46.23	92.52	0.73
Dharesh Gawech	93.65	6.35	144.15	-	-	56.56	144.15	43.44	1.26
Sargaon	10.80	89.20	28.16	-	-	10.80	28.16	89.20	0.61
Toru –Bhaila (Spices)	71.94	28.06	151.75	-	-	44.76	151.75	55.24	1.37
Total	79.24	20.76	370.29	-	-	42.12	370.29	57.88	1.11

Table-3.11: Distribution of Leased in and Leased out land by Terms and Conditions

Name of the Village	Leased in Land					Leased in Out				
	Crop Sharing	Crop and Cost Sharing	Both 1 & 2	Fixed Rent/ha (in Rs)	Total	Crop Sharing	Crop and Cost Sharing	Both 1 & 2	Fixed Rent/ha (in Rs)	Total
Dhali	0	0	0	0	0	0	0	0	0	0
Dharesh Gawech	0	0	0	0	0	0	0	0	0	0
Sargaon	0	0	0	0	0	0	0	0	0	0
Toru –Bhaila (Spices)	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0

Table-3.12: Distribution of Irrigated Area by Source

(Percentage)

Name of the Village	Canal	Tube well Diesel	Tube Well electric	Tank	Open well	Any other (Specify), IPH kuhl	Total Irr. Area (ha.)
Dhali	-	-	-	-	-	-	0
Dharesh Gawech	-	-	-	100.0	-	-	9.16
Sargaon	-	-	-	100.0	-	-	25.12
Toru –Bhaila (Spices)	-	-	-	-	-	100.00	42.58
Total	-	-	-	44.60	-	55.40	76.86

Table-3.13: Year of Starting the Horticultural Crops by the Farmers

(Percentage)

Name of the Village	Since our Child hood	Since long (> 10 Years)	Since 10 years	Since 5 years	Since 4 years	Since 3 Years	Since 2 years	Since 1 year	Total	Total (No.)
Dhali	-	100.0	-	-	-	-	-	-	100.0	63
Dharesh Gawech	-	100.0	-	-	-	-	-	-	100.0	114
Sargaon3	-	100.0	-	-	-	-	-	-	100.0	46
Toru –Bhaila (Spices)	-	100.0	-	-	-	-	-	-	100.0	111
Total	-	100.0	-	-	-	-	-	-	100.0	334

Table- 3.14: Cropping Pattern of Selected districts in Himachal Pradesh.

(Area in Hectares)

Items		2009-10		Percentage	
		Shimla	Sirmaur	Shimla	Sirmaur
(A)Food Crops	Cereals & Millets	27291	55395	31.41	74.77
	Pulses	5709	3665	6.57	4.95
	Sugarcane	0	1082	0.73	1.46
	Spices	637	3963	0.73	5.35
	Fruits	41557	1588	47.83	2.14
	Vegetables	11291	4919	13.00	6.64
	Oilseeds	393	1196	0.45	1.61
(B) Non food Crops	Fodder-crops	0	2124	0.00	2.87
	Other non food crops	0	157	0.00	0.21
	Gross cropped area	86878	74089	100	100

Source: Directorate of Revenue, Shimla, H.P.

Table-3.15: Motivating Factors for Taking up Horticulture Crops

(Multiple response %)

Name of the Village	Close to Market	Good Price	Easy to Grow	Less cultivation Cost	Govt Support	Neighbour Growers	Easy Seed/ Nurser Availability	Any other	Total Farmers
Dhali	9.52	95.24	77.78	63.49	6.35	28.57	19.05	-	63
Dharesh Gawech	44.74	74.56	58.77	57.02	-	59.65	37.72	-	114
Sargaon	2.17	84.78	91.30	71.74	2.17	43.48	4.35	-	46
Toru –Bhaila (Spices)	77.48	97.30	33.33	25.23	-	54.05	6.31	-	111
Total	43.11	87.43	58.38	49.70	1.50	49.70	19.16	-	334

Table-3.16: Preference-wise Motivating Factors for Taking up Horticulture Crops.

(Percentages)

Motivating Factors	Dhali	Dharesh Gawech	Sargaon	Toru-Bhala	Total
ClosetoMarket					
1	1.59	19.30	2.17	44.14	21.86
2	4.76	15.79	-	33.33	17.36
3	3.17	9.65	-	-	3.89
Good Price					
1	60.32	40.35	67.39	43.24	48.80
2	25.40	14.03	6.52	51.35	27.54
3	9.52	20.17	10.87	27.03	11.08
Easy to Grow					
1	17.46	11.40	-	7.21	9.58
2	57.14	31.58	76.09	7.21	34.43
3	3.17	15.79	15.22	18.92	14.37
Less input Cost					
1	1.59	2.63	6.52	-	2.09
2	58.73	15.79	13.04	-	7.78
3	3.17	38.60	52.17	25.22	39.82
Govt Support					
1	-	-	2.17	-	0.30
2	3.17	-	-	-	0.60
3	3.17	-	-	-	0.60
Neighbor Grows					
1	14.28	24.56	19.56	3.60	14.97
2	12.70	21.93	4.35	5.40	12.27
3	1.59	13.16	19.56	45.04	22.45
Easy Availability of Seed/Nursery					
1	1.59	6.14	2.17	3.60	3.89
2	4.76	19.30	-	0.90	7.78
3	12.70	12.28	2.17	1.80	7.48
Any other					
1					
2					
3					
Total Household	63	114	46	111	334

Chapter - IV

MAINTENANCE OF HORTICULTURE CROPS

a. Destruction and Rejuvenation of Horticulture Crops

The old and infected trees that have not been maintained for many years are removed and rejuvenated. During the survey it was noticed that in all the studied horticulture crops 2382 apple plants were rejuvenated by the growers in the area of 6.90 hectares in the last 5 years. The reason for rejuvenation of plants was destruction due to disease, drought, soil erosion and the old age of the plants (Table 4.1).

b. Kitchen Garden/Bund/Rooftop Plantation

These days when the use of chemicals in farming is increasing and the nutritional value of the produce is declining, health conscious farm households are growing organic produce in their kitchen gardens. The vegetables can also be grown on the rooftop of houses, in backyard and on bunds. The number of households having kitchen garden/rooftop/backyard has been given in Table 4.2 and the number of households having horticulture crops in the field bund has shown in Table 4.3. The table 4.2 shows that kitchen gardening is practiced only in the vegetable growing village under study. The farmers grow pumpkin, spinach, gourd, arbi, tomato, chillies, cucumber, carrot, radish, coriander, turnip and methi in their kitchen gardens. The annual production of these crops was 46, 13, 16, 32, 21, 4,15, 2,4,2,9 and 23 qtls respectively with the market value of Rs.27750, Rs.8070, Rs.6500, Rs.25840, Rs.14700, Rs.3600, Rs.7625, Rs.1332, Rs.2085, Rs.1540, Rs.4550 and Rs.11275 respectively. The table further reveals that none of the surveyed farmers is growing any horticulture produce on the rooftop and in the backyard of the house. Due to cold climatic conditions, in these areas the top of the houses are slant made of slates or iron sheets and houses are constructed on the sides of the hills leaving very less space in the backyard to grow horticulture produce. It was also observed during the survey that no farmer is growing horticulture crops on field bunds.

c. Adoption of New Technologies by the Farmers

The new technologies adopted by the farmers of the sampled villages in 2010-11 are given in Table 4.4. The new technologies adopted by the farmers were erecting of Polyhouses, Green houses and Integrated Nutritive Management/Integrated pest Management (INM/IPM). In the sampled area none of the farmers has Polyhouse or Greenhouse. INM includes to find out the deficiency of major plant nutrients like Nitrogen, phosphorus and potash, calcium, Iron, Sulphur etc. due to repeated cultivation. These deficiencies are examined by soil testing in laboratories and farmers are trained to upgrade their skill and knowledge regarding benefits of balanced use of fertilizers to remove the deficiencies. IPM emphasizes on the control of pest populations keeping pesticides to the levels that are economically justified and minimize risks to human health and environment. The table 4.3 shows that all the fruit and flower growers have adopted the technology INM/IPM in the area of 42.77 hectares and 9.48 hectares respectively. None of the vegetable and spice growers has adopted any kind of new technology. The problems faced by the fruit and flower growers in the application of new technology are inadequate quantity of insecticides and pesticides material and more formalities to receive the assistance from the government (Table 4.5).

d. Benefits Received from the Government for the Development of Horticulture

The data related to the benefits/extension services received by the growers from the state department of horticulture in 2010-11 is given in Table 4.5. The table reveals that in the village of fruit growers, all the 63 orchardists have received the benefit from the government under the National Horticulture Technology Mission (NHTM). The assistance was provided in the form of plants and equipments (power trailer, sprayer, scissors etc.) worth Rs.95280 and Rs.162400 respectively. In the case of floriculture, out of 46 growers, 44 i.e. about 96 percent have received the benefit from the government in the form of subsidy to increase the area under flowers. None of the vegetable and spice growers received the assistance from the government in any form.

Problems Faced by the Respondents

The various problems related to production and marketing of horticulture produce faced by the farmers of selected villages are presented in Table-4.7. The problems revealed are multiple in

response. The problems such as seeds and labour are from production side and road, storage, packing material and market centre are from marketing side had been considered as different types of problems. The table reveals that the lack of storage facilities is the main problem as revealed by 93 per cent of the farmers, followed by lack of packing material by 91 per cent, no market centre by 81 per cent, and lack of road infrastructure by 75 percent. From the production side the lack of human labour is the main problem faced by 73 percent of farmers followed by the non availability of seed by 36 percent.

Farmers Contacted by the Agencies

The members of farmers contacted by the different departments have been given in Table-4.8. The department of horticulture contacted 100 percent farmers of fruit and flowers growing villages to estimate the area and production of crops. The revenue department contacted all the spice and vegetable growing farmers of villages to estimate area only.

Prospects of Horticulture Expressed by the Farmers

From the farmers view's point, the better future of income generation is the most important prospect in the state it was expressed by 61 percent farmers (Table 4.9). The second important prospect, expressed by 56 percent farmers, was the better future of employment. About 41 percent farmers were of the view that the possibility of processing unit in the state is the future prospects of horticulture.

Suggestions for Development of Horticulture in Himachal Pradesh

The sampled farmers also asked to give their suggestion for the development of horticulture in the state. The related information has been given in Table-4.10. Table reveals that 93 percent farmers said that there should be the facilities of storage, followed by 91 percent farmers the availability of packing material should be at the nominal rate, 81 farmers wants the market place should be near, road should be all weather it was revealed by 75 percent farmers. Out of total 334 farmers, 36 percent farmers revealed that seed should also be available at proper time and on the fair price.

Table- 4.1: Horticulture Crops Plants Rejuvenated by the Farmers in the Last 5 Years

Name of the Village	Name of the Individual Crop Rejuvenated	Number of Plants Rejuvenated	Reason for Rejuvenation	Area Rejuvenation (ha)
Dhali	Apple	2382	Destroyed due to :-	6.90
	-	-	(i)Disease	-
	-	-	(ii) Drought	-
	-	-	(ii)Soil erosion	-
	-	-	(iv) Old Age	

Table-4.2: Number of Households Having Kitchen Garden

Village	Name of the Crop	No. of Household		If Yes or Having			
		Having	Not Having	Area (in ha)	No. of Plants	Production (qtl)	Annual Value (Rs.)
Dharesh Gawech	Pumpkin	101	-	0.20	101	46.25	27750
	Spinach	47	-	0.22	-	13.45	8070
	Gourd	64	-	0.088	64	16.25	6500
	Calocasia (Arbi)	93	-	0.54	-	32.30	25840
	Tomato	78	-	0.008	525	21.00	14700
	Chilies	66	-	1.8	-	3.60	3600
	Cucumber	58	-	0.08	-	15.25	7625
	Carrot	13	-	0.18	-	2.22	1332
	Radish	30	-	0.30	-	4.17	2085
	Coriander	38	-	0.22	-	2.20	1540
	Turnip	62	-	0.08	-	9.10	4550
	Fenugreek(Methi)	72	-	0.32	-	22.55	11275

Table- 4.3: Horticultural Crops Plants in the Field Bund Lands in 2010-11

Village	Name of the Crop	No. of Household		If Yes or Having			
		Having	Not Having	Area (in ha)	No. of Plants	Production (qtl)	Annual Value (Rs.)
Dhali		0	63	-	-	-	-
	Total	0	63	-	-	-	-
Dharesh Gawech		0	114	-	-	-	-
	Total	0	114	-	-	-	-
Sargaon		0	46	-	-	-	-
	Total	0	46	-	-	-	-
Toru-Bhaila		0	111	-	-	-	-
	Total	0	111	-	-	-	-
Total		0		-	-	-	-

Table-4.4: Adoption of High Technology by the Farmers in 2010-11

(Area in Ha)

	Poly House		Green House		INM/IPM		Other (Specify		Total Farmers	Area
Name of the Village	No. of Farmer	Area	No. of Farmer	Area	No. of Farmer	Area	No. of Farmer	Area		
Dhali	-	-	-	-	63	42.77	-	-	63	42.77
Dharesh Gawech	-	-	-	-	0	-	-	-	0	
Sargaon	-	-	-	-	46	9.48	-	-	46	9.48
Toru-Bhaila	-	-	-	-	0	-	-	-	0	

Table- 4.5: Benefits/Extension Services Received by the Farmers in (2010-11)

Village	Name of the Scheme	No. of HH Benefited	Year of Benefit	Nature of Assistance	Value of Assistance (in Rs)	Detail of Assistance
Dhali	N H TM	63	2010-11	1.Plants	95280	
				2. Equipment	162400	Power trailer, Sprayer, Scissors
Sargaon		44	2010-11	Subsidy	115000	To increase the area under flowers.

Table-4.6: Problem Faced by the Farmers in Application of High Technology in 2010-11

Village	Name of the Problem	No. of Farmers Under Poly House / Green House	No. of Farmers Under INM / IPM	No. of Farmers Under Other (Specify)
Dhali	Inadequate quantity of material	-	-	63
	More formalities to receive the assistance	-	-	63
Dharesh-Gawech		-	-	
Sargaon	Inadequate quantity of material	-	-	46
	More formalities to receive the assistance.	-	-	46
Toru-Bhaila		-	-	

Table-4.7: Nature of Problems Faced by the Farmers of Horticulture in 2010-11

Name of the Village	Road Infrastructure	Seeds	Packaging Material	Labour	Storage	Market	Other	Total Farmers
Dhali	27	0	52	63	59	63	0	63
Dharesh-Gawech	65	60	94	70	95	76	0	114
Sargaon	46	40	46	0	46	21	0	46
Toru-Bhaila	111	20	111	111	111	111	0	111
State Total (1 to 4)	249	120	303	244	311	271	0	334
Per cent	75	36	91	73	93	81	0	100

Table-4.8: Number of Farmers Contacted by the Agencies for Baseline Survey in Recent Years

Name of the Village/Block	Total Farmers	Farmer contacted	Year of Contacting	Name of the Agency	Information Sought (Two main)		Information Missed by the agencies (as You feel)	
Dhali	63	63	-	Revenue	Area	-	Production Yield	-
Dharesh-Gawech	114	114	-	Revenue	Area	-	Production Yield	-
Sargaon	46	46	-	Horticulture Department	Area	Production	Yield	-
Toru-Bhaila	111	111	-	Revenue	Area		Production Yield	-
State Total	334	334	-	-	-	-	-	-
Percent			-	-	-	-	-	-

Flower grower visited H DO for getting the subsidy.

Table-4.9: Three Most Important Future Prospects of Horticulture Expressed by Farmers

Name of the Village	Total Farmers	1	2	3
Dhali	63	Better future of income generation (40)	Better future of income employment (20)	Possibility of processing unit in the (30) State.
Dharesh Gawech	114	Better future of income generation (60)	Better future of income employment (80)	Possibility of processing unit in the (50) State.
Sargaon	46	Better future of income generation (25)	Better future of income employment (20)	Possibility of processing unit in the (18) State.
Toru-Bhaila	111	Better future of income generation (80)	Better future of income employment (70)	Possibility of processing unit in the (40) State.
State Total	334	205	190	138

Table-4.10: Suggestions given by the Farmers for the Improvement of Horticulture 2010-11.

(Multiple response)

Name of village	Road infrast-ructure	Seeds	Packing material	Labour	Storage	Market	Other	Total farmers
Dhali	27	0	52	63	59	63	0	63
Dharesh Gawech	65	60	94	70	95	76	0	114
Sargaon	46	40	46	0	46	21	0	46
Toru-Bhaila	111	20	111	111	111	111	0	111
State total	249	120	303	244	311	271	0	334
Percent	75	36	91	73	93	81	0	100

Summing up

It is concluded from the above that in all the studied horticulture crops, 2382 apple plants were planted for rejuvenation of the orchards in the area of 6.90 hectares in the last 5 years. The reason for rejuvenation of orchards was destruction of plants due to disease, drought, soil erosion and old age of the plants. The kitchen gardening is practiced only by the vegetable growers in the total surveyed households. These farmers grow pumpkin, spinach, gourd, arbi, tomato, chillies, cucumber, carrot, radish, coriander, turnip and methi in their kitchen gardens. The annual production of these crops was 46, 13, 16, 32, 21, 4, 15, 2, 4, 2, 9 and 23 qtls. respectively with the market value of Rs.27750, Rs.8070, Rs.6500, Rs.25840, Rs.14700, Rs.3600, Rs.7625, Rs.1332, Rs.2085, Rs.1540, Rs.4550 and Rs.11275 respectively. No farmer was growing horticulture crop on the rooftop, in the backyard of the house and on the bunds. All the fruit and flower growers have adopted the technology INM/IPM in the area of 42.77 ha and 9.48 ha respectively. None of the vegetable and spice growers has adopted any kind of technology. In the case of fruit growers, all have received the benefit from the Govt. under the National Horticulture Technology Mission (NHTM) in the form of plants and equipments. About 96 percent flower growing households have received the benefit from the Govt. in the form of subsidy. None of the vegetable and spice growers received assistance from the Government in any form.

Chapter - V

METHODOLOGIES ADOPTED AND TRAINING PROGRAMME CONDUCTED FOR ESTIMATING HORTICULTURE CROPS

Despite impressive development in horticulture sector, this is a general feeling that data base of horticulture crops is not comprehensive and reliable. This poses a serious problem in understanding the real development and growth of horticulture. In Himachal Pradesh three departments namely Land Records, Horticulture and Agriculture are involved in the collection and compilation of data related to horticultural crops (5.2). Therefore, the methods adopted by these departments for the collection of data regarding area, production and productivity of these crops are given below:

a. Methods adopted by Department of Land Records

In order to keep track of all information regarding ownership/possession, land use profile, crop-wise irrigated and unirrigated area, cropping pattern, production crop-wise etc., the data is collected and maintained by the department of Land Records. The nodal officer for the State is the Director of Land Records. Table 5.12 reveals that the channel for collection and compilation of data is Patwar circle, Kanongo circle, Tehsil, District and State (Directorate of Land Records).

Estimation of Area Under Crops

The data is collected by field to field harvest inspection every six months in the month of October for Kharif and in April for Rabi crops by Patwari (revenue official). He records the plot wise details regarding crop grown and land description by visiting the villages. This system of area enumeration is known as **'Girdawari'** (Table 5.5). The record is maintained by the Patwari for the 12 years after which it is retrieved from him and destroyed. This record is considered important as it acts as master file for many returns and reports. For example the

Agriculture Department uses the data on area under some crops for conducting crop-cutting experiments to estimate the productivity.

Estimation of Production and Productivity of Crops

Productivity or yield per hectare is one of the major indicators of production possibilities for any crop. Two methods are currently adopted to determine the production per hectare of crops in the state.

(i) Random Sampling Method: This method is used to estimate the yield per hectare in respect of four cereal crops viz maize, paddy, wheat, barley and two vegetable crops viz. potato and ginger. The crop cutting experiments by random sampling method is being conducted jointly by the field staff of Revenue and Agriculture Department. The results of crop-cutting experiments so obtained are being used to estimate the productivity and production. This method is discussed in detail under the methodology adopted by Agriculture Department in respect of production and productivity.

(ii) Traditional Method: The productivity in respect of all remaining crops is estimated on the basis of crop-cutting experiment by traditional method or Anawari method. These experiments at the field level are conducted jointly by the Department of Revenue and Agriculture. Two experiments are allotted to each Revenue Officer of each district. They used to visit the villages during harvesting time, select a plot under the particular crop, measure the plot and the production of the crop in the plot to estimate the yield per hectare.

b. Methods Adopted by Department of Agriculture

The department of Agriculture, Govt. of Himachal Pradesh has two schemes, namely Timely Reporting Scheme (TRS) and General Crop Estimation Survey (GCES) to collect and compile the data on area, production and productivity of different Kharif and Rabi crops (Table5.6). Under TRS, the data on area of cereals, pulses, oilseeds, spices and vegetables is collected and compiled. Under GCES crop cutting experiments are conducted to estimate the productivity of maize, paddy, wheat, barley (cereal crops), potato and ginger (vegetable crops) throughout the Himachal Pradesh using random sampling technique. Further, the department has one scheme i.e improvement of crop statistics (ICS) for inspection of the data collected by

the primary workers involved in the former two schemes sponsored by Ministry of Statistics and Programme Implementation, GOI. The other vegetables cauliflower, cabbage, peas, capsicum, beans etc. are not covered under GCES for estimation of productivity. The department has different methods for estimation of production and productivity of these vegetable crops and it also collects data on area of these vegetables using methods other than TRS.

Estimation of Area under Kharif and Rabi Crops

The department of agriculture collects and compiles the data of area under different crops including vegetables for a block of five years under TRS. The present block consists of the years 2008-09 to 2012-13. The survey is conducted in such a way that hundred percent revenue villages are covered once and only once in a block of five years. The stratified-multistage-random sampling technique is adopted to select the revenue villages. First, a district is taken from the list of district in the state. In a district, tehsils are numbered randomly and then selected using Random Number Table. List of random numbers to be used for locating plots. For example if tehsil A is marked 3 in the random process and 3 comes at fifth place in the table, then A will be taken at the fifth place. The Kanongo and Patwar circles are selected in the similar way after the selection of a tehsil. A list of revenue villages under Patwar circle is taken and 20 percent of villages are selected randomly for the first year. Again 20 percent of villages are selected for the second year without replacement of villages taken for the first year. In this way all the villages are covered in five years. After selection of villages for each year Revenue Commissioner is requested to notify the advanced enumeration. After the notification, the lists are circulated to Tehsildars and Revenue Officers. The particular types of schedules are provided to Patwaries to collect the data on area under each crop of each farmer in the selected village for the concerned season. The operation of collection of data is carried out from Ist August to 10th August for Kharif crops and from 16th February to 26th February for Rabi crops in each year which is known as advanced enumeration **(Advanced Girdawari).** The schedules are sent to district statistical staff for tabulation. At that stage the data is compiled upto tehsil levels.

Estimation of Productivity of Potato and Ginger

The crop cutting experiments are conducted to estimate the productivity of maize, paddy, wheat, barley (cereal crops), potato and ginger (vegetable crops) under the scheme GCES (Table5.9). The department of agriculture obtains a list of villages from Revenue Officers of each district in which the particular crop is cultivated in the area more than 2 hectares. Out of this list, 20 percent of the villages are selected using random sampling technique without replacement for each year. From each selected village 2 khasra numbers are selected using random number tables. Two random numbers are assigned to each village if the last Khasra number of the village is greater than the given random number then the Khasra number of given random number is selected for conducting the crop cutting experiment otherwise the random number is divided by the last Khasra number and the remainder is selected. If the selected Khasra number is not having the crop under experiment then the next Khasra number is selected. For example suppose that a village A has the last Khasra number 1253 and this village has been assigned 2 random numbers 0839 and 5012, then after the division the remainders are 839 and 0. Therefore for the experiments Khasra numbers 839 and 1253 are selected. If these Khasra numbers have the crop under experiment and have plots of the size 10 m x 2m then both are selected otherwise next Khasra number is selected.

In a selected Khasra number a farm, having the crop under the experiment, is selected randomly which can have a plot dimensions 10m x 2m. If this farm is having mixed crop, then the particular crop should have been cultivated in 10 percent area at least. There is a specific method to select a plot in a farm to conduct the crop cutting experiment. The farm should be selected before the harvesting season but the plot should be selected on the day of harvesting. Under the experiment harvesting and weighing of the crop are done under the supervision of the primary workers. Two types of the primary workers execute the experiments (i) Kanongo at tehsil levels and Agriculture Development Officer (ADO) at the block level. Approximately 80 percent of the experiments are executed by the Kanongo and 20 percent by ADO. To calculate the productivity of the particular crop per hectare, the production of the plot is multiplied by 500. After noting down the production in a given schedule the crop is returned to the concerned farmer.

The deficiencies in the system of crop statistics related to area, production and productivity are found through the joint efforts of central (NSSO) and state authorities (SASA) in the state. These two agencies check that (i) whether the Patwaries have carried out the work of crop inspection and preparing of abstract properly, (ii) whether the primary workers are conducting crop cutting experiments as per prescribed procedure.

The sample villages for checks on area enumeration and aggregation are generally a sub sample of TRS villages. The supervisory staff of both the NSSO and the SASA starts the checking immediately after the completion of the same under TRS that is from 11 August for Kharif crops and from 27 February for Rabi crops every year. In Himachal Pradesh 20 percent of already drown sample under TRS are taken for check. Thus every year total 280 villages are selected, out of which NSSO check 140 villages and SASA also 140 villages. The selection is done by simple random sampling without replacement separately for central and state samples.

Estimation of Area, Production and Productivity of Vegetable Crops other than Potato and Ginger

The data of area of vegetable crops namely cauliflower, cabbage, peas, capsicum, beans etc. is collected and compiled at four stages by the department of Agriculture independently without depending upon the department of Land Records. The department of Agriculture has Scientists in the Directorate, districts, blocks and circles. Each Agriculture Office at the district level is headed by Deputy Director and block office by Subject Matter Specialist (SMS) under whose two Agriculture Development Officers (ADO) work. Four Agriculture Extension Officers (AEOs) work under each ADO. The Agriculture Extension Officers use to visit the villages, in their circle (headed by ADO), to record the data regarding area and production of these vegetables on the basis of field observation and interviewing the farmers.

During the observations, the seeds distributed to the farmers by the Agriculture Department and the license holders registered with the Department of Agriculture is also taken into the consideration to estimate the production. The license to the private distributors is given with the condition that they have to submit the complete detail of the seeds sold to the farmers. The Agriculture department has some norms related to the seeds sown per hectare and then

production, is estimated from the quantity of seeds sown depending upon the weather conditions of that year and the irrigation facilities in the particular area. The productivity is calculated by using the method: production divided by area. The data is compiled at the district level and finally each Deputy Director sends the data to the Directorate of Agriculture at Shimla.

c. Methods Adopted by Department of Horticulture

The State Department of Horticulture functions with the objective of building a prosperous Himachal through scientific development of horticulture by harnessing the natural resources for the development of a sustainable system of agriculture in the hilly areas. The methods adopted by this department to collect the area, production and yield data with respect to fruits, flowers are given below.

Fruit Crops

The varied agro-climatic conditions of Himachal Pradesh are suitable for growing temperate and sub tropical fruit crops. Presently apple at high hill zone, stone, mango and citrus fruits in mid and low hill zone are the popular fruit crops in the state. Amongst these, apple is the main fruit crop and accounts for 90 percent of the total area under all fruit crops.

Estimation of Area Under Fruit Crops

For measuring area under different fruit crops, the Department of Horticulture has a very specific method. The Horticulture scientists have framed norms under which per hectare number of fruit plants are grown. Using these norms and mortality rate the area under fruit crops is calculated directly from the supply of nursery plants (Table5. 4). There are private (registered with Horticulture Department) and government nurseries at the block level which supply the nursery plants through the Horticulture Development Officer (HDO). The Horticulture Development Officers maintain the record of plants supplied to the orchardists every year. Generally the orchardists use to plant nursery fruit plants in the gap where plants have been damaged due to disease, and other gaps remained during raising the orchard (known as rejuvenated area) and also for raising new orchards. In order to calculate the total area under the particular crop at the end of the year the following method is adopted:

1. Take the total area under the fruit crop in the previous year.
2. Estimate the mortality in terms of area in hectares.
3. Net orchard area in the previous year = Total Area – Area due to mortality.
4. Consider total number of nursery plants supplied in the present year.
5. Estimate the mortality of plants after the summer of that year which varies from year to year depending upon weather conditions.
6. Find the area required to plant the survival number of plants (4-5) as per the norms set by the Department of Horticulture.
7. Subtract the area rejuvenated from the area given in (6). This is the net orchard raised this year. Finally, the total orchard area under the crop at the end of year is equal to net area raised in the current year + the net area of previous year.

The Horticulture Development Officer (HDO) of each block submits the detail of supply of plants to the office of Deputy Director Horticulture working at district level who further supply the data to Directorate at the state level where the data is compiled using above method to estimate the area under particular fruit crop district wise (Table 5.10).

Estimation of Production and Productivity of Fruit Crops

The fruits of Himachal Pradesh are supplied to various parts of India. There are limited main outlets from Himachal Pradesh attached in the border of Punjab, Haryana and Uttar Pradesh from where marketable surplus has to be crossed. Presently three outlets named as barriers at Parwanoo, Swarghat and Kuddu are the only points from where total quantity of fruits supply is registered (Table5.7). The total fruit produced during a year is estimated from the entries' at these barriers. After receiving the detail of entries of fruits from these barriers, Directorate of Horticulture use to add 10 percent of this quantity into it to estimate the total production. The inclusion of said 10 percent is due to home consumption and produce supplied to processing units etc.

To measure the productivity, the total production of the produce of current year is divided by the area under crop ten years back for apple, nuts and other sub-tropical fruits and by 7 years back for citrus fruits.

Flower Crops

The climate of Himachal Pradesh is suitable for the production of cut flowers and for the growth of this entrepreneur the state government of Himachal Pradesh has made very effective efforts. In case of popularity of the production of flowers the sub tropical zone i.e. foot and mid hills of the State has shown an excellent coverage of area under flowers.

Estimation of Area under Cut-Flowers

The whole process of estimating area can be divided into three levels. The Directorate of Horticulture is the apex body at State level, the office of the Deputy Director of Horticulture functioning at district level and the office of the Horticulture Development Officer (HDO) working at block level. The coordination system of these offices estimates the area, production and productivity of flowers in the state of Himachal Pradesh. In case of coverage of area in the State, the Directorate of Horticulture use to supply the targets to Deputy Director at district level for erecting polyhouses for which 80 per cent subsidy of the cost of erection of each polyhouse is provided by the department. These polyhouses are of two types such as high tech and traditional. The size of high tech polyhouse is 1000 square meters and the size of traditional polyhouse 500 square meters. By following these targets, the Deputy Director at district level depute Horticulture Development Officer (HDO) from the block office to find out farmers having interest in cultivation of cut-flowers. Under these directions the farmers have been made authorize to apply for erection of polyhouse in his owned land. In Block Development Office, HDO is incharge for sanctioning of polyhouses to the farmers.

To calculate the area under cut-flowers, the HDO use to maintain record of each ployhouse with respect to the size of polyhouse, number of plants to be planted etc. The experts of the cut-flowers have framed some norms under which per square meters number of plants have been prescribed as in the Table 5.1. By following these norms, it becomes easy to estimate the coverage of area for each flower. The said calculated area is supplied to the office of the Deputy Director at district level. After receiving area under different plants, the Deputy Director forward the statistics of area to Directorate of Horticulture at state level and finally said office made available the data of area under different flowers

Table- 5.1: Detail of Plant and flower production (per sq.mt.) calculated on the bases of Package of Practices for Floriculture crops published by University of Horticulture & Forestry Nauni, Solan, H.P.

S.No.	Name of the crop	Distance in (Cm)	Planting per sq. Mt.	Flower Production Per Sq. mt.
1.	Carnation	25x15	33	198 stem per sq.mt.
2.	Chrysanthemum Cut-Flower	15x15	58	290 flower per sq. mt.
3.	Chrysanthemum Loose flowers	30x30	11	5-6 Kg per sq. tm.
4.	Rose	25x40	10	150 stems per sq. tm.
5.	Gerbera	30x40	8	160 cut flower per sq. tm.
6.	Lilium Asiatic		65	60-65 flower per sq. mt.
	Lilium Oriental		45	40-45 flower per sq. mt.
	Lilium LA Hybrid		58	50-58 flower per sq. mt.
7.	Alstromeria	50x40	5	175-200 flowers per sq. mt.
8.	Gladiolus	25x15	26	20-26 flower per sq. mt.
9.	Marigold	40x40	6	6 Kgs per sq. mt.

Estimation of Production and Productivity of Cut-flowers

In this process, again HDO plays a very important role for the estimation of production of cut-flowers. Generally the HDO use to collect the information related to production through each polyhouse. The HDO collects information from the farmers about the number of flowers from a single corn/stick and maintains the statistics. Generally collection of flowers varies between 3 to 6 flowers from each corn/stick vary as per demand of the market. The said collected statistics of production use to be submitted in the office of the Deputy Director of Horticulture at district level and further mailed to apex body i.e. Directorate of Horticulture at state level. For estimating production the experts of floriculture department choose lowest range of production per stick from the data supplied through district level. Thus minimum production range method is used to calculate the production of flowers i.e. **Number of Plants of a Particular Flower X Lowest Production per Plant.** After calculating production, productivity is calculated by using the method: Production divided by Area. Finally the department publishes the statistics of production of different flowers grown in the State.

d. Training and Extension Programmes Conducted for Officials for estimation of Horticultural Crops.

During the field survey, officials involved in estimation of horticultural crops were interviewed for obtaining required information. It was revealed by the officials contacted that no training and extension programme has been conducted to provide training/awareness in estimation of horticultural crops (Table-5.8).

Table-5.2: Agencies Involved in Collection of Horticulture Data 2010-11

Name of the Village	Horticulture	Agriculture	Revenue
Dhali	yes	-	yes
Dharesh Gawech	-	yes	yes
Sargaon	yes	-	-
Toru-Bhaila	-	yes	yes

Table-5.3: Data Collecting Agency and the Crops Covered With Area, Production and Yield in 2010-11

Village	Name of the Crop*	Agency	Area	Production (qtl)	Yield (kg/ha)
Dhali	**Apple**	Horticulture	34.39	1761.11	5121
		Revenue	-	-	-
Sub-total			34.39	1761.11	5121
Dharesh Gawech	**Vegetables**	Agriculture	62.44	11361.89	181.96
		Revenue	-	-	-
Sub-total			62.44	11361.89	181.96
Sargaon	**Flowers (Chrysanthemum)**	Horticulture	7.52	609120	81000
Sub-total			7.52	609120	81000
Toru-Bhaila	**Spices(Ginger)**	Agriculture	26.61	1995.75	7500
		Revenue	-	-	-
Sub-total			26.61	1995.75	7500

Table-5.4: Method Adopted for Collection of Data (Area) on Horticulture Crops in 2001-11 (Department of Horticulture)

Name of the Village	Fruits	Vegetables	Flowers	Spices
Dhali	Using the record of area under the crop in the previous year and the no. of plants supplied in the current year	-	-	-
Dharesh Gawech	-	-	-	-
Sargaon	-	-	No. of polyhouses multiplied by the size of polyhouses	-
Toru-Bhaila	-	-	-	-

Note:-Farmer's supply the documents of land to the Horticulture Deptt.

Table-5.5: Method Adopted for Collection of Data (Area) on Horticulture Crops in 2001-11 (Department of Revenue)

Name of the Village	Fruits	Vegetables	Flowers	Spices
Dhali	Girdawari	-	-	-
Dharesh Gawech		Girdawari	-	-
Sargaon	-	-	-	-
Toru-Bhaila	-	-	-	Girdawari

Table-5.6: Method Adopted for Collection of Data (Area) on Horticulture Crops in 2001-11 (Department of Agriculture)

Name of the Village	Fruits	Vegetables	Flowers	Spices
Dhali	-	-	-	-
Dharesh Gawech	-	1-TRS 2- On the basis of field observation and interviewing the farmers.	-	-
Sargaon	-	-	-	-
Toru-Bhaila	-	-	-	TRS

Table-5.7: Method Adopted for Collection of Data (Production) on Horticulture Crops in 2001-11 (Department of Horticulture)

Name of the Village	Fruits	Vegetables	Flowers	Spices
Dhali	Through the entries at three outlet barriers namely Parwanoo, Swarghat, and Kuddu,	-	-	-
Dharesh Gawech	-	-	-	-
Sargaon	-	-	Through minimum production range method i.e. No. of plants of a particular flower multiplied by lowest production per plant	-
Toru-Bhaila	-	-	-	-

Table-5.8: Method Adopted for Collection of Data (Production) on Horticulture Crops in 2001-11 (Department of Revenue)

Name of the Village	Fruits	Vegetables	Flowers	Spices
Dhali	-	-	-	-
Dharesh Gawech	-	Potato: Through crop cutting experiments under GCES jointly with Agriculture Deptt. Other Vegetables:- Anawari method	-	-
Sargaon	-	-	-	-
Toru-Bhaila	-	-	-	Ginger:- Through crop cutting experiments under GCES jointly with Agriculture Deptt.

Table-5.9: Method Adopted for Collection of Data (Production) on Horticulture Crops in 2001-11 (Department of Agriculture)

Name of the Village/Block	Fruits	Vegetables	Flowers	Spices
Dhali	-	-	-	-
Dharesh Gawech	-	Potato: Through crop cutting experiments under GCES jointly with Agriculture Deptt. Other Vegetables:- Field observation and interviewing the farmers. During the observations seed distribution is also taken into consideration	-	-
Sargaon	-	-	-	-
Toru-Bhaila	-	-	-	Ginger:-Through crop cutting experiments under GCES

Table-5.10: Forwarding Collected Data and Verification of Horticulture Crops (Department of Horticulture)

Crops	Village to Block	Block to District	District to State	Verification at village level	Verification at District level	Verification at State Level
Fruits	Horticulture Extension Officer	Horticulture Extension Officer	Deputy Director Horticulture	Horticulture Extension Officer	Deputy Director Horticulture	Director Horticulture
Vegetables	-	-	-	-	-	-
Flowers	Horticulture Extension Officer	Horticulture Extension Officer	Deputy Director Horticulture	Horticulture Extension Officer	Deputy Director Horticulture	Director Horticulture
Spices	-	-	-	-	-	-

Table-5.11: Forwarding Collected Data and Verification of Horticulture Crops (Department of Agriculture)

Crops	Village to Block	Block to District	District to State	Verification at village level	Verification at District level	Verification at State Level
Fruits	-	-	-	-	-	-
Vegetables	Agriculture Extension Officer	Subject Matter Specialist	Deputy Director Agriculture	Agriculture Extension Officer	Subject Matter Specialist	Director Agriculture
Flowers	-	-	-	-	-	-
Spices	Agriculture Extension Officer	Subject Matter Specialist	Deputy Director Agriculture	Agriculture Extension Officer	Subject Matter Specialist	Director Agriculture

Table-5.12: Forwarding Collected Data and Verification of Horticulture Crops (Department of Revenue)

Crops	Village to Block	Block to District	District to State	Verification at village level	Verification at District level	Verification at State Level
Fruits	Patwari	Kanongo	Deputy Director Revenue.	Patwari	Kanongo	Director Revenue
Vegetables	Patwari	Kanongo	Deputy Director Revenue	Patwari	Kanongo	Director Revenue
Flowers	-	-	-	-	-	-
Spices	Patwari	Kanongo	Deputy Director Revenue	Patwari	Kanongo	Director Revenue

Table-5.13: Training Conducted for Estimating of Area, Production and Yield (2010-11)

Name of the Village	Name of Training	Duration$	Place*	Yes/No		If yes, Mention advantages
				Yes (1)	No (2)	
Dhali	-	-	-	-	No	-
Dharesh Gawech	-	-	-	-	No	-
Sargaon	-	-	-	-	No	-
Toru-Bhaila	-	-	-	-	No	-
Total	-	-	-	-	No	-

Table-5.14: Comparison of data on Horticultural crops with other Agencies in 2010-11

Name of the Village	Crops	Comparison		If yes, Give details
		Yes (1)	No (2)	
Dhali	Fruits	-	2	-
	Vegetables	-	-	-
	Flowers	-	-	-
	Spices	-	-	-
	Garden/plantation	-	-	-
	Medicinal Plants	-	-	-
	Aromatic Plants	-	-	-
Dharesh Gawech	Fruits	-	-	-
	Vegetables	-	2	-
	Flowers	-	-	-
	Spices	-	-	-
	Garden/plantation	-	-	-
	Medicinal Plants	-	-	-
	Aromatic Plants	-	-	-
Sargaon	Fruits	-	-	-
	Vegetables	-	-	-
	Flowers	-	2	-
	Spices	-	-	-
	Garden/plantation	-	-	-
	Medicinal Plants	-	-	-
	Aromatic Plants	-	-	-
Toru-Bhaila	Fruits	-	-	-
	Vegetables	-	-	-
	Flowers	-	-	-
	Spices	-	2	-
	Garden/plantation	-	-	-
	Medicinal Plants	-	-	-
	Aromatic Plants	-	-	-

Chapter – VI

SURVEY RESULTS OF HORTICULTURE CROPS

a. Area, Production and Yield of the Sample Villages

Horticulture sector in Himachal Pradesh plays a great role in the state economy. Since the scope for extension of cultivation to newer areas, is limited due to topography, soil conditions etc, emphasis for increasing the farm incomes and living standards of the rural people, has to be laid on increased production by maximizing output per unit area available for cultivation. Besides impressive development of this sector in the state, it felt that data base of horticultural crops is not comprehensive and reliable. This poses a serious problem in designing appropriate strategies and programmes of development in the state. Keeping in view this problem the present study has been conducted in the state to identify the gaps in data on area, production and productivity of horticultural crops. It has been observed during the survey that all the farmers are growing the horticulture crops on their private land only.

Area, Production and Yield of Fruit Crop (Apple)

Apple is the main fruit crop in temperate region of the state. The data on area, production and productivity has been collected by complete enumeration of all the orchardists in Dhali village of Jubbal block in Shimla district selected under the study. The result of the survey has been presented in Table 6.1. The area under apple orchards has been presented for bearing and non bearing apple plants. Accordingly, fruit bearing plants covered 34.39 hectares (80 per cent) area of the total orchard. While area under non bearing plants is 8.38 hectares. Thus, total area under apple is 42.77 hectares in the village. The total production of apple in the village is 10408 quintals and yield is 24335 kg per hectare. It is also reveals from the table that the entire area under apple is un-irrigated.

Area, Production and Yield of Vegetable Crops

Himachal Pradesh has vast potential for production of off season vegetables which have great demand in the plain areas of country. The area, production and productivity of vegetable crops grown in the village Dharesh-Gawech in Theog block of Shimla district under study has been given in Tables 6.2. Total gross cropped area under vegetables was 62.44 hectares. It is seen from the table that the irrigated area in both seasons was 15.04 hectares and 47.40 hectares

area was un-irrigated. Further table reveals that in irrigated area, Peas, cauliflower, cabbage, beans and potato are grown in both kharif and rabi season. Out of total irrigated GCA the area in both seasons (kharif and rabi) was 40, 26 , 21 and 6 percent under peas, cauliflower, beans and cabbage respectively. The crop of capsicum grown in kharif season only occupied about 5 percent area of irrigated GCA. In un-irrigated conditions during both kharif and rabi seasons the area of peas was 27 percent followed by cabbage 21 percent, cauliflower 20 per cent and beans 18 percent. At the overall level, out of total GCA (62.44 hect.), peas occupied 23.54 percent followed by cauliflower 22 percent, beans 19 percent and cabbage 18 percent. The average yield per hectare of capsicum, peas, cauliflower, cabbage, beans, potato and tomato estimated to be 7689 kg, 5013 kg, 28685 kg, 23387 kg., 7088 kg., 14345 kg. and 12500 kg. in kharif season respectively. The yield per hectare of peas, cauliflower, cabbage, beans and potato worked out to 4600 kg., 20019 kg., 23693 kg. and 11000 kg. in rabi season respectively.

Area, Production and Yield of Flowers (Chrysanthemums)

Chrysanthemum is the only flower crop grown by farmers in Sargaon village in Rajgarh block of Sirmaur district under study. The area, production and productivity of this crop in the village is presented in Table 6.3. It is reveals from the table that the area under Chrysanthemums is 9.48 hectares as estimated by survey carried out in the village. The entire area under the crop is irrigated. Out of total area Chrysanthemums is grown in 91 per cent area as a sole crop and rest 9 percent area is mixed with maize. The total production of Chrysanthemums is worked out to 3826159 sticks. The contribution of sole crop in total production is 91 per cent and remaining 9 per cent production worked out with maize cultivation. The average yield is 403603 sticks per hectare. Per hectare yield is 406512 sticks for mono crop as against of 375181 sticks for mixed cropping.

Area, Production and Yield of spices: Ginger

Among spices, ginger is the major crop grown in village Toru-Bhaila selected for the study. Total area under ginger in the village is 26.61 hectares (Table 6.4). Out of total area, 54 percent area is under sole crop and rest is grown with calocasia, chillies, turmeric, *bhang jeera* (local grain) and maize as mixed crop. The total area under ginger in the village is irrigated. It is seen from the table that out of total production of 2096 quintals, 64 per cent is contributed by

sole crop and remaining 36 percent is contributed by the production of ginger with other crops. The average yield of ginger is estimated to be 7877kg per hectare in the village. The higher yield of 9378 kg per hectare is registered in case of ginger grown as sole crop while yield of ginger grown with other crops is 6139 kg per hectare.

Table-6.1: Area, Production and Yield of Horticultural Crops (Annual- 2010-11 (Fruits)

Village		Irrigated			Unirrigated/Dry			Total		
	Name of the Crop	Area (ha)	Production (qtl)	Yield (kg/ha)	Area (ha)	Production (qtl)	Yield (kg/ha)	Area (ha)	Production (qtl)	Yield kg/ha)
Dhali	Apple									
	Bearing	0	0	0	34.39	10408	30266	34.39	10408	30266
	Non-Bearing	0	0	0	8.38	0	0	8.38	0	0
	Total	0	0	0	42.77	10408	24335	42.77	10408	24335

Table-6.2: Area, Production and Yield of Vegetables Crops. (Area in ha, Prod. in Qtl Yield in Kg)

Crops	Irrigated			Un-Irrigated			Total		
Kharif	**Area**	**Prod.**	**Yield**	**Area**	**Prod.**	**Yield**	**Area**	**Prod.**	**Yield**
Capsicum	0.68 (4.54)	56	8235	1.96 (4.12)	147	7500	2.64 (4.23)	203	7689
Peas	2.88 (19.21)	165	5729	4.8 (10.08)	220	4583	7.68 (12.30)	385	5013
Cauliflower	1.88 (12.54)	555	29521	6.64 (13.94)	1889	28449	8.52 (13.64)	2444	28685
Cabbage	0.32 (2.13)	78	24375	6.44 (13.52)	1503	23339	6.76 (10.82)	1581	23387
Beans	2.04 (13.60)	152	7451	4.52 (9.50)	313	6925	6.56 (10.51)	465	7088
Potato	0.32 (2.13)	48	15000	3.80 (7.98)	543	14289	4.12 (6.60)	591	14345
Tomato	0.04 (0.27)	5	12500	0	0	0	0.04 (0.07)	5	12500
Rabi									
Peas	3.20 (21.34)	155	4844	8.04 (16.88)	362	4502	11.24 (17.99)	517	4600
Cauliflower	2.04 (13.61)	415	20343	3.12 (6.55)	618	19808	5.16 (8.27)	1033	20019
Cabbage	0.60 (4.00)	145	24167	3.76 (7.90)	888	23617	4.36 (6.99)	1033	23693
Beans	1.04 (6.94)	67	6442	4.12 (8.65)	256	6214	5.16 (8.27)	323	6260
Potato	0	0	0	0.20 (0.42)	22	11000	0.20 (0.33)	22	11000
Gross cropped area	15.00 (100.00)			47.40 (100.00)			62.44 (100.0)		

Source: Own Survey.

Table-6.3: Area, Production and Yield of Horticultural Crops (Annual -2010-11 (Flowers)

Village		Irrigated			Unirrigated/Dry			Total		
	Name of the Crop*	Area (ha)	Production (No. of sticks)	Yield (No. of sticks /ha)	Area (ha)	Production (No. of sticks)	Yield (No. of sticks /ha)	Area (ha)	Production (No. of sticks)	Yield (No. of sticks /ha)
Sargaon	Chrysanthemum (42)	8.60	3496000	406512	0	0	0	8.60	3496000	406512
	Chry+Maize (4)	0.88	330159	375181	0	0	0	0.88	330159	375181
	Total	9.48	3826159	403603	0	0	0	9.48	3826159	403603
	Mixed crop's production									
	Maize(4)		5.20 qtl.							

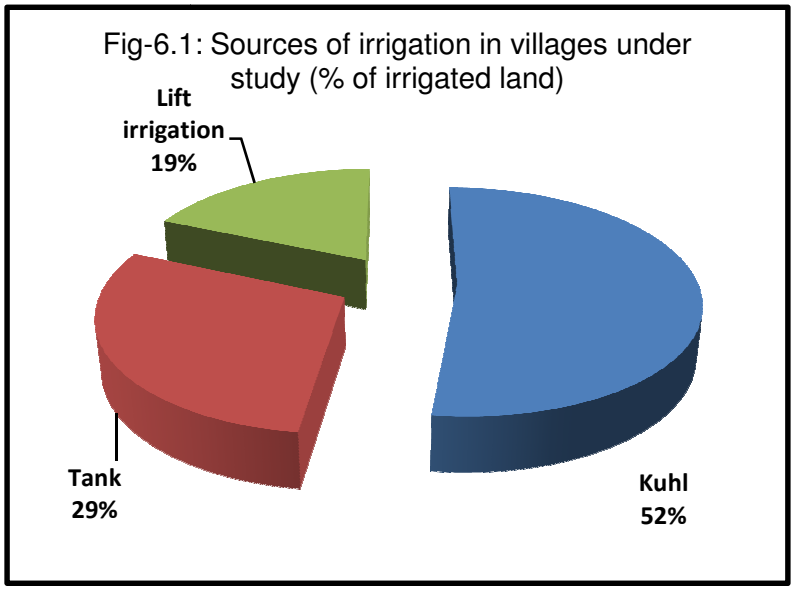
Table-6.4: Area, Production and Yield of Horticultural Crops (Annual -2010-11 Spices)

Village		Irrigated			Unirrigated/Dry			Total		
	Name of the Crop*	Area (ha)	Production (qtl)	Yield (kg/ha)	Area (ha)	Production (qtl)	Yield (kg/ha.)	Area (ha)	Production (qtl)	Yield (kg/ha.)
Sargaon	Ginger(64)	14.28	1339	9378	0	0	0	14.28	1339	9378
	Gr. +Arvi(9)	2.16	121	5601	-	-	-	2.16	121	5601
	Gr. +Chilies'(7)	2.08	117	5625	-	-	-	2.08	117	5625
	Gr. +Turmeric(19)	5.04	334	6626	-	-	-	5.04	334	6626
	Gr. +Bhangzeera (3)	1.13	70	6195	-	-	-	1.13	70	6195
	Gr.+Maize(9)	1.92	115	5990	-	-	-	1.92	115	5990
	Total	26.61	2016	7877	-	-	-	26.61	2096	7877
	Mixed Crop's production									
	Gr+ Maize(9)	1.92	5.48	285	-	-	-	1.92	5.48	285
	Ginger +Arvi(9)	2.16	6.70	310	-	-	-	2.16	6.70	310
	Ginger +Chilies(7)	2.08	0.22	11	-	-	-	2.08	0.22	11
	Ginger +Turmeric(19)	5.04	6.88	136	-	-	-	5.04	6.88	136
	Ginger +Bhang(3)	1.13	0.14	12	-	-	-	1.13	0.14	12

Sources of Irrigation

In all villages 44.25 hectares land was under irrigation in kharif season and 6.88 hectares in Rabi season. Land under irrigation in village Dharesh-Gawech was 15.04 hectares, 9.48 hectares in village Sargaon and 26.61 hectares land in village Toru-Bhaila. The land irrigated

by kuhl (gravity channel) was 26.61 hectares; by tank 15.04 hectares and 9.48 by lift irrigation system (Table 6.5 & Fig. 6.1).



Per hectare number of plants

Crop wise per hectare number of plants have been estimated and the results are presented in Table 6.6. In capsicum and tomato about 12000 plants per hectare were planted for each crop. The farmers planted about 13300 plants per hectare for cauliflower and 10,000 plants for cabbage. In flowers the plants per hectare of chrysanthemum estimated to be about 4 lakh to 5 lakh. In case of apple farmers planted about 346 plants per hectare.

Mono and mixed cropping systems

Distribution of area under mono and mixed cropping in different seasons also estimated and results are given in Table 6.7. The table shows that the total area of fruit is under mixed cropping system. In case of vegetables and flower mono cropping system is practiced. It may also be noted from the table that the area under spice (ginger) is under both mono and mixed cropping system.

Farm Gate Prices

During the time of survey the information about area, production and farm gate price also collected and presented in Table 6.8. It is seen from the table that total area under fruit is

42.77 hectare and production from this area is 10408 quintal. The farm gate price of apple at the time of harvesting of crops was 4000 per quintal. Further, table reveals that different vegetables are grown in the study village during both kharif and rabi seasons. Out of total area (62.44 ha.) under vegetables the maximum area was under peas 18.92 hectares and minimum area was under tomato 0.04 hectare. The maximum price was for both peas and tomato Rs. 1000 per quintal and lowest price was for cabbage Rs. 600 per quintal. The price of flower was Rs. 5 per stick. The farm gate price of ginger was Rs. 2000 per quintal.

Table-6.5: Distribution of Irrigated Land under Horticultural Crops.

(in ha)

Village	Major Crop Category	Tank	Kuhl.	Lift Irr.	Total
Dhali	Fruits(Apple) Annual	-	-	-	-
	Vegetables	-	-	-	-
Total Farmers		-	-	-	-
Dharesh Gawech	Vegetables (Kharif)				
	Capsicum	0.68	-	-	0.68
	Peas	2.88	-	-	2.88
	Cauliflower	1.88	-	-	1.88
	Cabbage	0.32	-	-	0.32
	Beans	2.04	-	-	2.04
	Potato	0.32	-	-	0.32
	Tomato	0.04	-	-	0.04
	Total	8.16	-	-	8.16
	Vegetables (Rabi)				
	Peas	3.20	-	-	3.20
	Cauliflower	2.04	-	-	2.04
	Cabbage	0.60	-	-	0.60
	Beans	1.04	-	-	1.04
	Total	6.88	-	-	6.88
Total Farmers				-	
Sargaon	Flowers- Kharif (Chrysanthemum)	-	-	9.48	9.48
Total Farmers		-	-	-	-
Toru-Bhaila	Spices(Ginger) Kharif	0	26.61	-	26.61
Total Farmers		-	-	-	-
Total					

Table-6.6: Number of Plants in the Area covered During Different seasons 2010-2011

(Area in ha)

Village	Major Crop Category	Kharif		Rabi		Annual		Total	
		Area	plant	Area	plant	Area	Plant		plant
Dhali1	Fruits(Apple)					42.77	14825	42.77	14825
Total farmers	63				-	-	-		-
Dharesh Gawech	Vegetables				-	-	-		-
	Capsicum	2.64	-	0	-	-	-	2.64	-
	Peas	7.68	-	11.24	-	-	-	18.92	-
	Cauliflower	8.52	-	5.16	-	-	-	13.68	-
	Cabbage	6.76	-	4.36	-	-	-	11.12	-
	Beans	6.56	-	5.16	-	-	-	11.72	-
	Potato	4.12	-	0.20	-	-	-	4.32	-
	Tomato	0.04	-	0	-	-	-	0.04	-
	Total	36.32	-	26.12	-	-	-	62.44	-
Total farmers	114				-	-	-		-
	Flowers (Chrysan themum)	9.48	3864000		-	-	-	9.48	3864000
	Aromatic				-	-	-	-	-
Total farmers	46				-	-	-	-	-
Toru-Bhaila	Fruits		-	-	-	-	-	-	-
	Vegetables		-	-	-	-	-	-	-
	Flowers		-	-	-	-	-	-	-
	Spices (Ginger)	26.61	-	-	-	-	-	26.61	-
	Garden/ plantation		-	-	-	-	-	-	-
	Medicinal		-	-	-	-	-	-	-
	Aromatic		-	-	-	-	-	-	-
Total farmers	111		-	-	-	-	-	-	-
Total	334		-	-	-	-	-	-	-

Table-6.7: Distribution of Area under Mono and Mixed Cropping in Different Seasons

(Area in Ha)

Village	Major Crop Category	Kharif			Rabi			Annual			Total		
		Mono	Mixed	Total	Mono	Mixed	Total	Mono	Mixed	Total	Mono	Mixed	Total
Dhali	**Fruits**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**42.77**	**42.77**	**0**	**42.77**	**42.77**
Total Farmers	**63**												
Dharesh Gawech	Capsicum	2.64	**-**	2.64	-	**-**		**-**	**-**	**-**	2.64	**-**	2.64
	Peas	18.92	**-**	18.92	-	**-**		**-**	**-**	**-**	18.92	**-**	18.92
	Cauliflower	13.68	**-**	13.68	-	**-**		**-**	**-**	**-**	13.68	**-**	13.68
	Cabbage	11.12	**-**	11.12	-	**-**		**-**	**-**	**-**	11.12	**-**	11.12
	Beans	11.72	**-**	11.72	-	**-**		**-**	**-**	**-**	11.72	**-**	11.72
	Potato	4.32	**-**	4.32	-	**-**		**-**	**-**	**-**	4.32	**-**	4.32
	Tomato	0.04	**-**	0.04	-	**-**		**-**	**-**	**-**	0.04	**-**	0.04
	Total	62.44	**-**	62.44	-	**-**		**-**	**-**	**-**	62.44	**-**	62.44
Total Farmers	114												
Sargaon	Flowers	9.48	0	9.48	0	0	0	0	0	0	9.48	-	9.48
Total farmers	46												
Toru-Bhaila	Spices(Ginger)	14.28	12.33	26.61	**-**	**-**	**-**	**-**	**-**	**-**	14.28	12.33	26.61
Total Farmers	**111**	-	-	-	-	-	-	-	-	-	-	-	-
State Total	**334**												

Table-6.8: Area, Production, Marketed Qty and Farm Gate Price by season in 2010-11

(Area in Ha; Quantity in qtl, Price in Rs/qtl)

Village	Major Crop Category	Kharif			Rabi			Annual			Total		
		Area	Pro#	FGP*	Area	Pro#	FGP*	Area	Pro#	FGP*	Area	Pro#	FGP*
Dhali	Fruits(Apple)	-	-	-	-	-	-			5548			5548
	Bearing	-	-	-	-	-	-	34.39	10408	5548	34.39	10408	5548
	N-Bearing	-	-	-	-	-	-	8.38	0	-	8.38	0	-
	Vegetables	-	-	-	-	-	-	42.77	10408	-	42.77	10408	-
Total Farmers	63	-	-	-	-	-	-	-	-	-			-
Dharesh Gawech	Vegetables	-	-	-	-	-	-	-	-	-			-
	Capsicum	2.64	203	1300	0	0		-	-	-	2.64	203	-
	Peas	7.68	385	1900	11.24	517	1000	-	-	-	18.92	902	-
	Cauliflower	8.52	2444	1400	5.16	1033	800	-	-	-	13.68	3477	-
	Cabbage	6.76	1581	1100	4.36	1033	600	-	-	-	11.12	2614	-
	Beans	6.56	465	2000	5.16	323	900	-	-	-	11.72	788	-
	Potato	4.12	591	1200	0.20	22	700	-	-	-	4.32	613	-
	Tomato	0.04	5	1400	0	0		-	-	-	0.04	5	-
	Total	36.32	5674		26.12	2928		-	-	-	62.44	8602	-
Total Farmers	114							-	-	-			-
Sargaon	Flowers(Chrysanthemum)	9.48	3864000	5/Stick				-	-	-	9.48	3864000 sticks	5/Stick
Total Farmers	46							-	-	-			
Toru-Bhaila	Spices(Ginger)	26.61	2096	2000	-	-	-	-	-	-	26.61	2096	2000
Total Farmers	111	-	-	-	-	-	-	-	-	-	-	-	-
Total	**334**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	-

#Production

* Farm Gate Price and Total Marketed Qty, and the latter (FGP) should be given in Parenthesis

b. Area, Production and Yield estimated by the different Agencies

The state agencies involved in estimation of area, production and productivity of horticulture crops in Himachal Pradesh are department of revenue for area of vegetable crops, fruit crops and ginger, department of horticulture for estimation of area and production of flower crops, yield and production of fruit crops and department of agriculture for estimation of production and yield of ginger and vegetable crops. The estimation of area, production and yield of various crops are discussed below:

Area, Production and Yield of Apple

The area under apple in the village Dhali is recorded by village revenue official. The area under apple recorded by village revenue official is 42.77 hectares during 2009-10 in Dhali village. Production of apple is calculated by multiplying yield estimated at district level with the area of village obtained from village official. The average yield of apple estimated by the department of horticulture is 5121 kg per hectare and thus the total production comes out to 1761 qtls in the village (Table 6.9). The yield of apple is estimated by observation for which Horticulture Extension Officer visit area during harvesting season and contacted some fruit growers for obtaining area and production of contacted farmers.

Area, Production and Yield of Vegetables

The area under vegetable is recorded by revenue official at village level. The area under vegetable crops recorded by village revenue official in kharif and rabi seasons has been given in the Table 6.9. It may be seen from the table that the area under kharif and rabi vegetables is 36.32 and 26.12 hectares respectively in the village under study. Total area under vegetable crops in both the seasons during 2010-11 is 62.44 hectares in the village. The production is calculated by multiplying area with yield. The yield of vegetable crops is estimated by the department of agriculture at block level. The yield is estimated by field observation of crop condition by the officials of agriculture department. The yield of capsicum, peas, cauliflower, cabbage, beans, potato and tomato grown in kharif season estimated by the department of agriculture is 15000, 10480, 23000, 36000, 10000, 15000 and 32000 kg per hectare, respectively. The yield of peas, cauliflower, cabbage, beans and potato grown in rabi

season is 10480, 23000, 36000, 10000 and 15000 kg per hectare respectively. The estimated production of different vegetables grown by the farmers in the village ranged between 2433.6 quintals in case of cabbage to 12.80 quintals in case of tomato produced in kharif season. In rabi season total production of vegetable crops ranged between 1569.6 quintal in case of cabbage to 30 quintals in case of potato.

Area, Production and Yield of Flowers - Chrysanthemum

The estimation of area, production and yield is carried out by the department of horticulture. Area under Chrysanthemum recorded by the horticulture department is 7.52 hectares in the village Sargaon under study. The total production of this flower during 2010-11 is 60,9120 sticks with average yield of 81000 sticks per hectare (Table 6.9).

Area, Production and Yield of Ginger

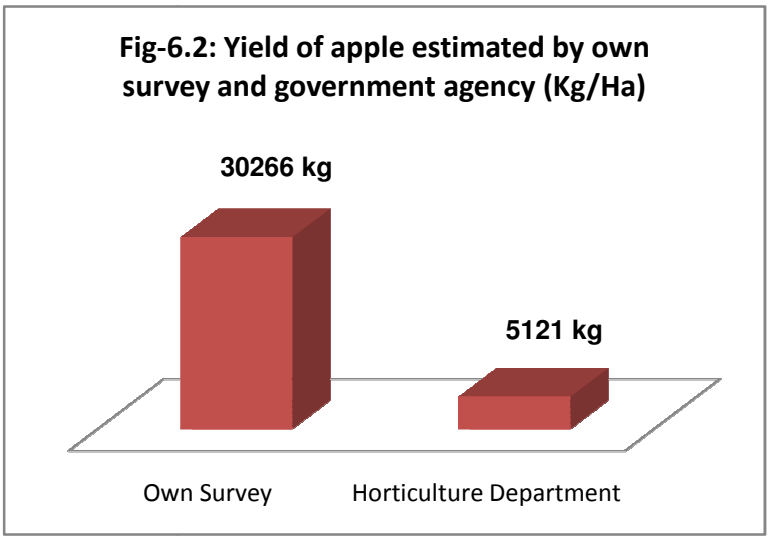
The area under ginger recorded by the village revenue official is 26.61 hectares. The yield is estimated by the agriculture department through crop cutting experiment under the scheme GCES. The average yield estimated through this method is 7500 kg at block level. Hence, the production of ginger in the village under study is 1995.75 quintals.

The area under mixed crops is not recorded by any state agency at village or block level. Production of mixed crops is also not recorded at any level by the state agencies. However, there is large quantity of mixed and inter crops produced in all the four villages under study. The inter cropping system in fruit crops is also in practice which is not recorded by any state agency involved in area and production of fruits.

c. Difference Between the Two estimates (Survey and Agencies)

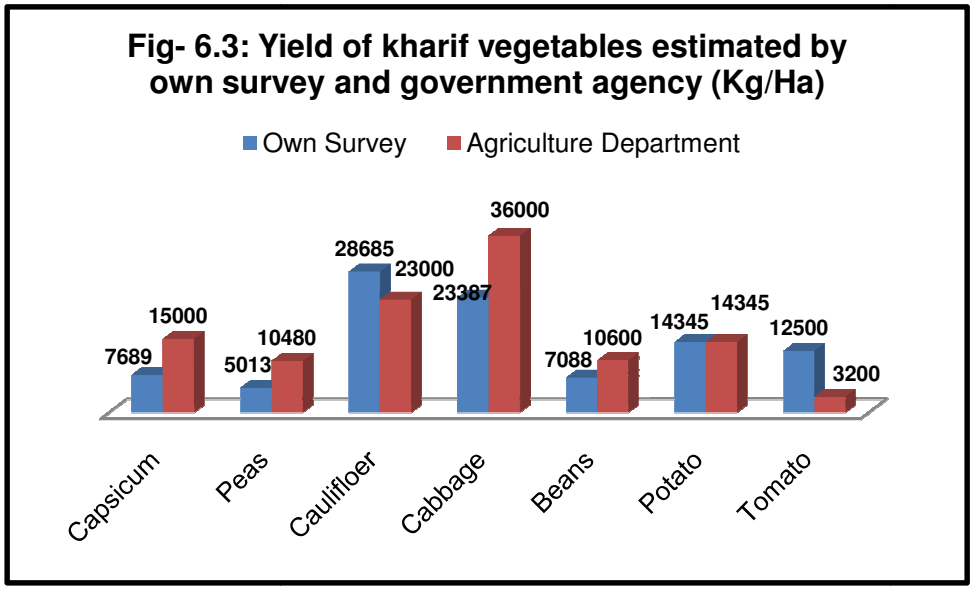
Large gaps have been observed in estimation of area, production and productivity of horticultural crops between survey and state agencies. In case of flower crops systematic/proper recording of area, production and productivity is completely missing. Moreover, the data on these aspects available with the horticulture department is not reliable as the estimates are based on the amount of subsidy provided by the department to the farmers. The gaps in estimation of state agencies and our survey have been analyzed and presented in Table 6.9. The area under apple in the village estimated by revenue department

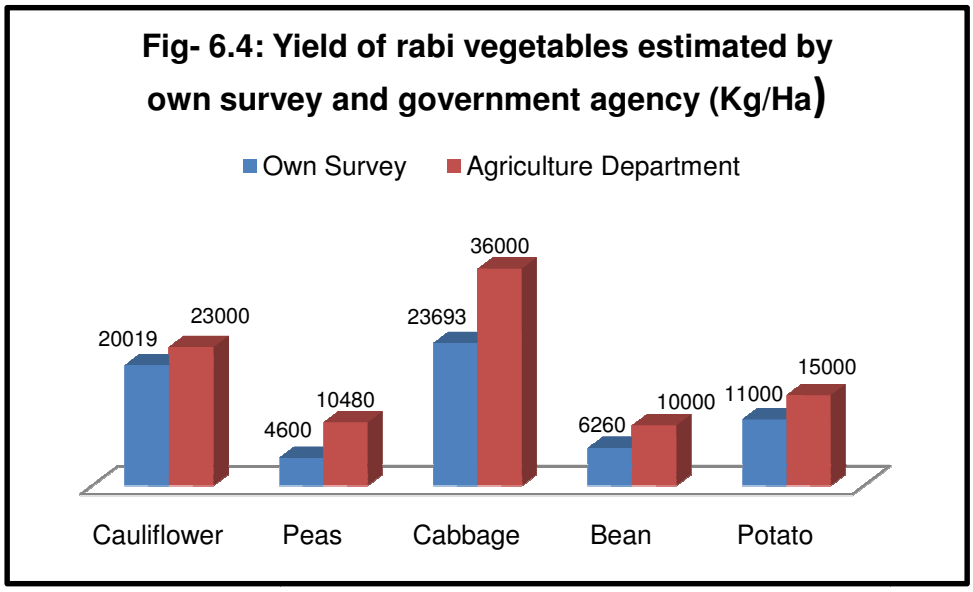
and obtained by survey is same while variation is observed in yield estimation. In apple average yield estimated by survey is significantly higher than that of horticulture department (See Fig. 6.2). The gap in yield of survey and state agency worked out to be 25145 kg per hectare which is 491 percent higher than that of yield estimated by horticulture department.



The area under kharif and rabi vegetable crops the village estimated by revenue department and obtained by survey is same while variation is observed in yield estimation. In case of kharif vegetable crops, yield estimated by the department of agriculture for capsicum, peas, cauliflower, cabbage, beans, potato and tomato at block level. Except cauliflower, yield of these vegetable crops estimated by the state agency is higher than that of yield measured by survey (Fig.6.3). The difference is 7311, 5467, (-)5685, 12613, 3512, 655 and 19500 kg per hectare capsicum, peas, cabbage, beans, potato and tomato. These yield gaps ranged between 4.37 per cent in case of potato to 60.94 per cent in case of tomato. The yield of cauliflower measured by survey data is 5685 kg (24.71 %) higher than that of state agency.

In rabi vegetable crops, yield estimated by the department of agriculture for capsicum, peas, cauliflower, cabbage, beans and potato. The analysis reveals that the estimated yield of all the vegetable crops grown in rabi season is higher than that of yield of these crops measured by survey data. The gap is 5880, 2981, 12307, 3740 and 4000 kg per hectare (Fig. 6.4). The yield gaps ranged between 12.96 per cent in case of cauliflower to 56.10 per cent in case of peas.





The difference has been observed in area and yield estimated for flower crop by state agency and survey conducted in the village under study. The area under chrysanthemums measured by survey is 9.48 hectares while horticulture department estimated as 7.52 hectares which is 1.91 hectares more than that of survey area (Fig. 6.5). The area measured by survey is 26.00 percent higher than estimated by state agency. The yield of chrysanthemum is 40360 sticks per hectare as per survey data and 81000 sticks per hectare measured by department of horticulture (Fig. 6.6). Thus, yield of this flower estimated by state agency is more than double as compared to survey data.

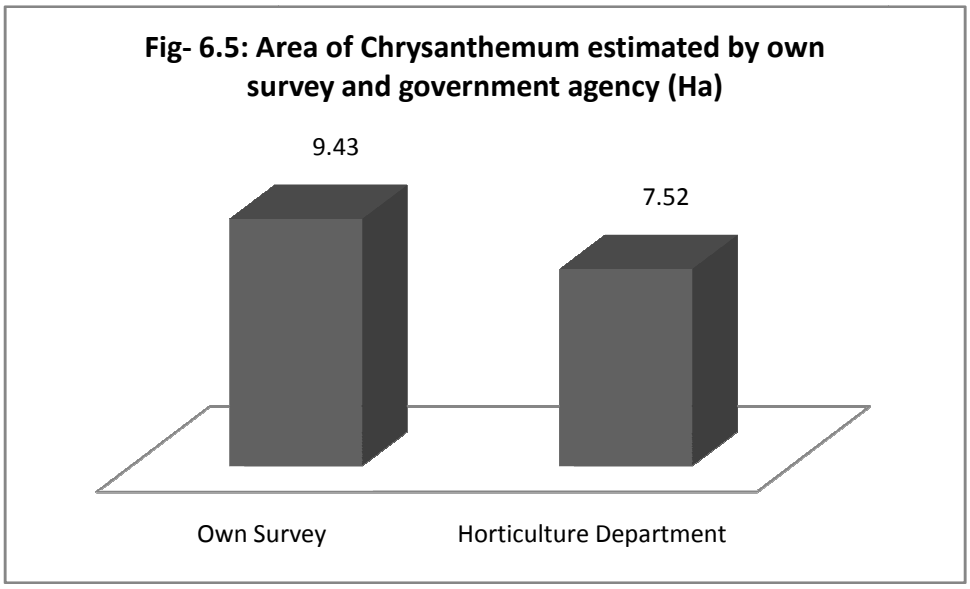


Fig- 6.5: Area of Chrysanthemum estimated by own survey and government agency (Ha)

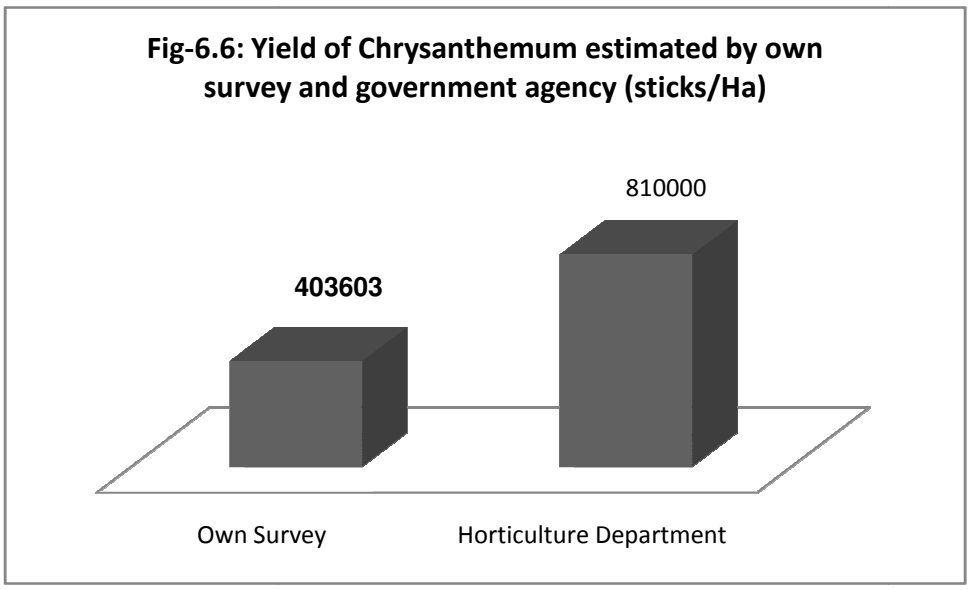
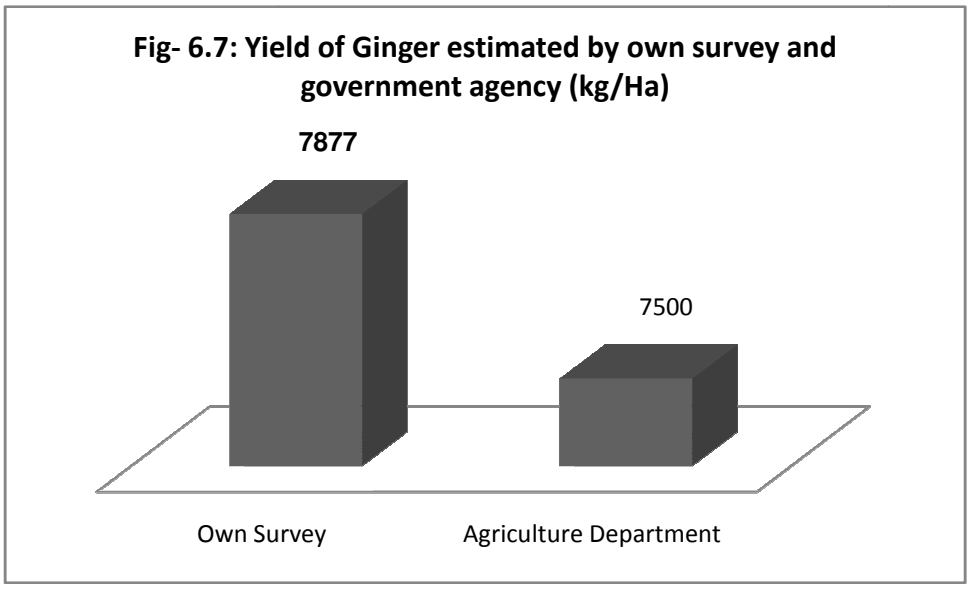


Fig-6.6: Yield of Chrysanthemum estimated by own survey and government agency (sticks/Ha)

The area under ginger in the village estimated by revenue department and obtained by survey is same while variation is observed in estimated yield. The yield estimated by agriculture department by crop cutting method is 7500 kg per hectares which is lesser than the yield of 7877 kg per hectare measured by survey (Fig.6.7). The gap estimated to be 377 kg higher than the state agency. Thus, yield measured by survey is 5.02 percent higher than the state agency estimation.



d. Summing up

The Department of revenue for area of vegetable crops, fruit crops and ginger, department of horticulture for estimation of area and production of flower crops, yield and production of fruit crops and department of agriculture for estimation of production and yield of ginger and vegetable crops are state agencies involved in estimation of area, production and productivity of horticulture crops in Himachal Pradesh. The yield of apple is estimated by observation for which Horticulture Extension Officer visited area during harvesting season and contacted some fruit growers for obtaining area and production of contacted farmers. The area under vegetable is recorded by revenue official at village level. The yield is estimated by field observation of crop condition by the officials of agriculture department. The estimation of area, production and yield of flower crop is carried out by the department of horticulture. The area under ginger is recorded by the village revenue official. The yield is estimated by the agriculture department through crop cutting experiment under the scheme GCES. The area under mixed crops is not recorded by any state agency at village or block level. Production of mixed crops is also not recorded at any level by the state agencies. However, there is large quantity of mixed and inter

crops produced in all the four villages under study. Inter cropping system in fruit crops is also in practice which is not recorded by any state agency involved in area and production of fruits. In case of flower crops systematic/proper recording of area, production and productivity is completely missing. The area under apple in the village estimated by revenue department and obtained by survey is same while variation is observed in yield estimation. The gap in yield of survey and state agency worked out to be 25145 kg per hectare which is 491 percent higher than that of yield estimated by horticulture department. The area under kharif and rabi vegetable crops in the village estimated by revenue department and obtained by survey is same. In case of kharif vegetable crops, except cauliflower, yield of other vegetable crops estimated by the state agency is higher than that of yield measured by survey. These yield gaps ranged between 4.37 per cent in case of potato to 60.94 per cent in case of tomato. The yield of cauliflower measured by survey data is 5685 kg (24.71 %) higher than that of state agency. In rabi vegetable crops, yield gaps ranged between 12.96 per cent in case of cauliflower to 56.10 per cent in case of peas. The area of flower crop measured by survey is 26 percent higher than estimated by state agency. The yield of this flower estimated by state agency is more than double as compared to survey data. There is no difference in area under ginger in the village estimated by revenue department and obtained by survey. The yield of ginger measured by survey is 5.02 percent higher than the state agency estimation.

Table- 6.9: Area, Production and Yield of Horticulture Crops

Village		Surveyed			By Agency District Level			By Agency Block Level		
	Name of the Crop	**Area (ha)**	**Production (qtl)**	**Yield (kg/ha)**	**Area (ha)**	**Production (qtl)**	**Yield (kg/ha)**	**Area (ha)**	**Production (qtl)**	**Yield kg/ha)**
Dhali	Apple-Bearing	34.39	10408	30266	34.39	1761.11	5121	-	-	-
	Non-bearing	8.38	-	-	8.38	-	-	-	-	-
	Total	42.77	-	24335	42.77	-	-	-	-	-
Dharesh Gawech	**Vegetables (Kharif)**									
	Capsicum	2.64	203	7689	-	-	-	2.64	396.000	15000
	Peas	7.68	385	5013	-	-	-	7.68	804.86	10480
	Cauli.	8.52	2444	28685	-	-	-	8.52	1959.60	23000
	Cabbage	6.76	1581	23387	-	-	-	6.76	2433.60	36000
	Beans	6.56	465	7088	-	-	-	6.56	656.00	10600
	Potato	4.12	591	14345	-	-	-	4.12	618.00	15000
	Tomato	0.04	5	12500	-	-	-	0.04	12.80	32000
	Total									
	Vegetables (Rabi)									
	Capsicum	0	0	0	-	-	-	-	-	-
	Peas	11.24	517	4600	-	-	-	11.24	1178.63	10480
	Cauli.	5.16	1033	20019	-	-	-	5.16	1186.80	23000
	Cabbage	4.36	1033	23693	-	-	-	4.36	1569.60	36000
	Beans	5.16	323	6260	-	-	-	5.16	516.00	10000
	Potato	0.20	22	11000	-	-	-	0.20	30.00	15000
	Tomato	0	0	0	-	-	-	0	0	0
Sargaon	**Chrysanthemum**									
	cut flower.	9.48	3826159	403603	7.52	6091200	810000	-	-	-
	Loose flower(kg)	-	-	-	-	-	-	-	-	-
Toru-Bhaila	**Ginger**									
	Ginger	26.61	2096	7877	-	-	-	26.61	1995.75	7500

Chapter – VII

DIFFICULTIES ENCOUNTERED BY THE AGENCIES WHILE COMPILING HORTICULTURE DATA

Many difficulties exist at different levels –administrative, financial, and technical and infrastructure, which hamper the growth of horticulture data system. Some of the administrative problems are: lack of trained staff, their willingness participation and coordination among themselves to arrange the data systematically after its collection and lack of motivation. Financial difficulties include lack of sufficient funds available for collection and compilation of data, in particular no specific allocation of funds for different activities involved in data development and its management. That is, the present system of financial support/ funds available for proper development of horticulture data is only a kind of minor support. This is certainly going to effect the data collection and its handling. Technical problems include deficiencies in the use of methodology to estimate the production by inadequate trained staff, ineffective application of methods and procedures. Infrastructural difficulties are: non availability of good transport facilities to visit the fields and also non availability of equipments for compilation of data. In these circumstances, it is difficult to get reliable data in a stipulated time. The various difficulties faced by the different agencies are as under:-

a. Department of Revenue

Statistics of crop area are compiled with the help of the revenue official (commonly known as *Patwari*). In the State, a complete enumeration of all fields called *girdawari* is made in every village during each crop season to compile land use, irrigation and crop area statistics by revenue department. They are considered fairly reliable because of the *patwari's* intimate knowledge of local agriculture and his ready availability in the village. However, there are some problems faced by the Patwari, in estimation and compilation of the data (Table 7.1):-

1. The *Patwari (revenue official*) is overburdened with multifarious functions and has to cope with a large geographical jurisdiction, extending over more than 10 villages. With an increasing range of functions assigned to the *Patwari time to time*, the *girdawari*

tended to receive low priority. Shortage of the staff is the another reason for the heavy load of work.

2. The officials do the work in off- hours, but there is no provision of honorarium or financial incentives for over-time.

3. The officials face the problems in measuring the area, production and yield of crops on small and scattered land holdings due to contour/ hilly topography of the state.

4. There is no proper format to estimate the separate area of individual crop under mixed cropping system.

5. The area of some crops are not listed separately but clubbed together under “other crops”.

6. Crops grown on encroached Government land are not included in Girdawari

b. **Department of Agriculture**

The department estimates the production and yield of the vegetables along with cereal crops in the state. Estimates of crop production are obtained by multiplying the area under crop and the yield rate. The yield rate estimates (Potato and Ginger) are based on scientifically designed crop cutting experiments conducted under the General Crop Estimation Survey (GCES). The agriculture extension officers use to visit the villages, in their circle (headed by ADO), to record the data regarding area and production of vegetables on the basis of field observation and interviewing the farmers. There are some problems faced by the officials in estimation the area, production and yield (Table 7.2). These are as under:-

1. The method of crop cutting experiments if properly followed provides reliable estimates of yield rates. In practice, however, the field staff does not strictly follow the prescribed procedures and thereby the survey estimates are subject to a variety of non-sampling errors.

2. The another problem is the shortage of the staff to estimate area, production and yield of different crops for individual village in the state.

3. The department gets the data of area from the department of Revenue. There is no provision to check the data in the department.

4. The officials are also engaged in multiple functions therefore they face the problem of shortage of time for their routine work and they do this work in off- hours, but there is no provision of honorarium/incentives for over-time.

5. The officials face the problems in measuring the area, production and yield of crops on small and scattered land holdings due to hilly/ contour topography of the state.

6. It is difficult for the staff to be present at time of every harvesting of many vegetables is done in a number of harvesting extending over several weeks.

7. Short duration crops of vegetables which are sown and harvested between two Girdawari periods are missed and therefore their area and production goes unreported.

8. There is no method to estimate the separate area of individual crop under mixed cropping system.

c. Department of Horticulture

There are some problems which faced by the officials in estimation the area, production and yield of fruit crops (Table 7.3). These are as under:-

1. There is shortage of the staff in the department. Therefore, there is heavy load of work of collection, and compilation of the data.

2. The officials do the work in off- hours, but there is no provision of honorarium/ incentives for over-time.

3. There is no method to estimate the area, production and yield of crops under inter-cropping system.

4. Total area under fruit crops is not recorded by the village level primary workers as fruits are also grown on canal banks, field bunds, road sides, backyard of houses.

5. Fruit Crops grown on encroached Government land are not included in estimation.

d. Suggestions

1. The *Patwari* agency and the *girdawari*, which has stood the test of time and proved to be cost effective and efficient in generating crop and land use statistics down to the village level, should be restored to its past level of performance. It is suggested to declare the *girdawari* as a programme of high priority and the *Patwari* be mandated to carry out the crop inspection according to the prescribed time schedule, if necessary, by sparing him from other duties during that period.

2. The systematic and periodic training should be imparted to Patwari and the fieldwork should be subjected to intensive supervision by the technical staff.

3. There should be strict supervision of fieldwork by higher-level revenue and agricultural officials and appropriate action taken against those whose performance is consistently bad.

4. For proper and timely conduct of the *girdawari*, the concerned supervisory staff should be made accountable.

5. As the *Patwari* is overburdened with multifarious functions and has a large geographical jurisdiction extending to over more than 10 villages in the state, therefore to reduce the burden of the Patwari, his jurisdiction of villages should be reduced.

6. There should be provision of honorarium/incentives for work in off-hours.

7. There should be direct interaction between the Improvement of Crop Statistics (ICS) staff and the higher level officials of revenue and agricultural departments to get the accurate statistics.

8. Since many 'fruits and vegetables' crops are grown in areas not covered by the land records system, it may be necessary to have a separate system to assess the production and area of such crops grown in these areas.

e. Summing-up

It is seen that a major reason for the poor quality of area statistics is the failure of the revenue official (*Patwari)* to devote adequate time and attention to the *girdawari*. The fact is that the

Patwari is overburdened with multifarious functions and has a large geographical jurisdiction extending to over more than 10 villages in the state.

Table-7.1: Problems (3 important) faced by Different Agencies while collecting Data (Department of Horticulture)

Name of the Village	Problem	Fruits	Vegetables	Flowers	Spices
Dhali	I	Heavy load of work	-	-	-
	II	No honorarium for extra work	-	-	-
	III	Tough geographical conditions.	-	-	-
Dharesh Gawech		-	-		-
Sargaon	I	-	-	Heavy load of work	-
	II	-	-	No honorarium for extra work	-
	III	-	-	Tough geographical conditions.	-
Toru-Bhaila		-	-		-

Table-7.2: Problems (3 important) faced by Different Agencies while collecting Data (Department of Agriculture)

Name of the Village	Problem	Fruits	Vegetables	Garden crop	Flowers	Medicinal	Spices	Aromatic
Dharesh Gawech	I		Heavy load of work					
	II		No honorarium for extra work					
	III							

Table-7.3: Problems (3 important) faced by Different Agencies while collecting Data (Department of Revenue)

Name of the Village	Problem	Fruits	Vegetables	Flowers	Spices
Dhali	I	Heavy load of work	-	-	-
	II	No honorarium for extra work	-	-	-
	III	Tough geographical conditions.	-	-	-
Dharesh Gawech		-	-	-	-
Sargaon		-	-	-	-
Toru-Bhaila	I	-	-	-	Heavy load of work
	II	-	-	-	No honorarium for extra work

Table-7.4: Crops Not Covered in the Estimations and Reasons in 2010-11

Name of the Village	Name of the Crops	Reason 1	Reason 2	Reason 3
Dhali	-	-	-	-
Sargaon	All flowers	Not included in format	-	-
	-		-	-
	-		-	-
Toru-Bhaila	Cardamom	Not included in format	-	-
			-	-

Table-7.5: Suggestions made by Different Agencies for the improvement of Horticulture Crops

Departments	1	2	3
Horticulture	More staff should be provided to reduce the work load.	Honorarium should be given for extra work	There should be a format to correct the data.
Agriculture	More staff should be provided to reduce the work load.	Honorarium should be given for extra work	There should be a format to correct the data.
Revenue	More staff should be provided to reduce the work load.	Honorarium should be given for extra work	There should be a format to correct the data.

Chapter-VIII

CONCLUSION AND POLICY IMPLICATIONS

a) Brief findings of the Study

Horticulture sector in Himachal Pradesh plays a great role in the state economy. Besides impressive development of this sector in the state, it felt that data base of horticultural crops is not comprehensive and reliable. This poses a serious problem in designing appropriate strategies and programmes of development in the state. Keeping in view this problem the present study has been conducted in four villages in the state to identify the gaps in data on area, production and productivity of horticultural crops.

The analysis reveals that the area has increased significantly under fruits and flowers from 67.531 thousand hectares in 2007-08 to 79.024 thousand hectares and 0.583 thousand hectares in 2007-08 to 0.682 thousand hectares in 2009-10 respectively. Whereas the area of spices was almost same during this period. The area of vegetables has slightly decreased from 35.764 thousand hectares to 35.672 thousand hectares during the period of study. As far as yield is concerned that yield of spices vegetables and flowers has increased significantly. Whereas yield of fruits has decreased during the period of study.

Shimla district alone accounts for 43 per cent of area and 48 per cent of total production in the state in 2009-10. It is also concluded that area and production of all fruits has been continuously increasing in the state and in the opinion of many experts a stage has been reached where horticulture sector is being extended to marginal lands. This is having negative impact on productivity and profitability of horticulture sector. It is being advocated that policy should increasingly cater to productivity enhancement rather than on increasing area. The area of various vegetables in the state during the year 2009-10 is 35672 hectares. Shimla district ranked first in area under vegetables followed by Sirmaur in the State. It is concluded that the productivity of vegetables was higher in Hamirpur district followed by Bilaspur. The area under flowers has increased from 583 hectares to 682 hectares. The district Sirmaur has highest area under flowers, followed by Kangra and Solan. The share of Sirmaur district in total area of

flowers is 59 percent during 2009-10 year. Ginger is cultivated in all districts of the state excluding Kinnaur and Lahaul- Spiti. The district Sirmaur, Solan and Bilaspur are the major areas for producing quality ginger. Poor quality planting material including seed and root stocks; poor layout of orchards; lack of appropriate polynizer in the orchard, lack of proper training and pruning of the fruit trees; inadequate plant nutrition and organic matters; lack adequate use of plant protection materials; poor overall management of orchards are the major problems in horticultural crops. Post harvest quality controls almost non-existent resulting in considerable wastage and damage. The goals of planning in Himachal Pradesh, clearly shows that the planners in Himachal Pradesh have, by and large, followed the framework and objectives of the National Plan and have thus failed to give the much-needed regional focus for planned development in the context of the distinct physical features and environmental conditions of the State.

Out of total surveyed households, majority of the respondents were in the age group of 26.50 years. The percentage of males in the total population was relatively more as compare to females and 28 percent of the total family members were children. The maximum respondents were illiterate in the case of spice growing households and all persons were literate in the case of fruit growing households. Forty eight percent of the respondents were educated up-to high school level and 16 percent were illiterate in all the categories of households. The highest educated persons in most of the households were up to secondary level. The majority of the farm households, fall in the general category and few households belong to scheduled castes and other backward castes. The religion of all the families is Hindu. The distance of the village from the nearest main market was maximum in the case of floriculture and minimum for the vegetable growing village.

In the surveyed villages 61 per cent growers belong to marginal category. The proportion of land under irrigation was relatively higher in the flower grower village as compare to other villages under study. The leased in and leased out system of land was non-existent in the villages under study. The average size of holding was (1.37 ha.) in the case of spice growers and (0.61 ha.) in the case of flower growers.

The result of cropping pattern reveals that the total gross cropped area (GCA) of Shimla district was 86878 hectares in 2009-10. Out of total GCA, 48 percent area was under fruits followed

by cereals and millets 31 percent, vegetables 13 percent and pulses about 7 percent. There was marginal area under sugarcane, spices and oilseeds crops. Further it may be seen from the table that there was no area under fodder crops and non food crops in this district. The gross cropped area (GCA) of Sirmaur district was 74089 hectares in the same year. The area under cereals and millets was highest (75 percent) followed by vegetables (about 7 per cent), spices (5.35 percent) and pulses (5 percent). It is also revealed from the table that the area under fodder crops and other non food crops was 2.87 and 0.21 percent respectively.

All the surveyed growers had started to grow the horticulture crops more than 10 years back. In all the categories 'good price', which is first in ranking, remained the main motivating factor for taking up horticulture crop. The Govt. support' is not a motivating factor in any of these crops.

In fruit growing village 2382 apple plants were planted for rejuvenation of the orchards in the area of 6.90 hectares in the last 5 years. The reason for rejuvenation of orchards was destruction of plants due to disease, drought, soil erosion and old age of the plants. The kitchen gardening is practiced only by the vegetable growers in the total surveyed households. These farmers grow pumpkin, spinach, gourd, arbi, tomato, chillies, cucumber, carrot, radish, coriander, turnip and methi in their kitchen gardens. No farmer was growing horticulture crop on the rooftop, in the backyard of the house and on the bunds. All the fruit and flower growers have adopted the technology INM/IPM in the area of 42.77 ha and 9.48 ha respectively. None of the vegetable and spice growers has adopted any kind of technology. In the case of fruit growers, all have received the benefit from the Govt. under the National Horticulture Technology Mission (NHTM) in the form of plants and equipments. About 96 percent flower growing households have received the benefit from the Govt. in the form of subsidy. None of the vegetable and spice growers received assistance from the Government in any form.

The Department of revenue for area of vegetable crops, fruit crops and ginger, department of horticulture for estimation of area and production of flower crops, yield and production of fruit crops and department of agriculture for estimation of production and yield of ginger and vegetable crops are state agencies involved in estimation of area, production and productivity of horticulture crops in Himachal Pradesh. The yield of apple is estimated by observation for which Horticulture Extension Officer visited area during harvesting season. The area under

vegetable is recorded by revenue official at village level. The yield is estimated by field observation of crop condition by the officials of agriculture department. The estimation of area, production and yield of flower crop is carried out by the department of horticulture. The area under ginger is recorded by the village revenue official. The yield is estimated by the agriculture department through crop cutting experiment under the scheme GCES. The area under mixed crops is not recorded by any state agency at village or block level. Production of mixed crops is also not recorded at any level by the state agencies. However, there is large quantity of mixed and inter crops produced in all the four villages under study. Inter cropping system in fruit crops is also in practice which is not recorded by any state agency involved in area and production of fruits. In case of flower crops systematic/proper recording of area, production and productivity is completely missing. The area under apple in the village estimated by revenue department and obtained by survey is same while variation is observed in yield estimation. The gap in yield of survey and state agency worked out to be 25145 kg per hectare which is 491 percent higher than that of yield estimated by horticulture department. The area under kharif and rabi vegetable crops in the village estimated by revenue department and obtained by survey is same. In case of kharif vegetable crops, except cauliflower, yield of other vegetable crops estimated by the state agency is higher than that of yield measured by survey. These yield gaps ranged between 4.37 per cent in case of potato to 60.94 per cent in case of tomato. The yield of cauliflower measured by survey data is 5685 kg (24.71 %) higher than that of state agency. In rabi vegetable crops, yield gaps ranged between 12.96 per cent in case of cauliflower to 56.10 per cent in case of peas. The area under flower crop measured by survey is 26 percent higher than estimated by state agency. The yield of this flower estimated by state agency is more than double as compared to survey data. There is no difference in area under ginger in the village estimated by revenue department and obtained by survey. Yield measured by survey is 5.02 percent higher than the state agency estimation.

b) Conclusion and Policy Implications

The study reveals that a major reason for the poor quality of area statistics is the failure of the revenue official (*Patwari)* to devote adequate time and attention to the *girdawari*. The fact is that the *Patwari* is overburdened with multifarious functions and has a large geographical jurisdiction extending to over more than 10 villages in the state.

It is suggested to declare the *girdawari* as a programme of high priority and the *Patwari* be mandated to carry out the crop inspection according to the prescribed time schedule, if necessary, by sparing him from other duties during that period.

To improve the statistics of area, production and yield of horticultural crops in Himachal Pradesh the following suggestions are made:

The systematic and periodic training should be imparted to Patwari and the fieldwork should be subjected to intensive supervision by the technical staff. There should be strict supervision of fieldwork by higher-level revenue and agricultural officials and appropriate action taken against those whose performance is consistently bad. For proper and timely conduct of the *girdawari*, the concerned supervisory staff should be made accountable.

To reduce the burden of the Patwari, his jurisdiction of villages should be reduced. There should be provision of honorarium/incentives for work in off-hours.

There should be direct interaction between the Improvement of Crop Statistics (ICS) staff and the higher level officials of revenue and agricultural departments to get the accurate statistics.

Annexure Table- 1: Block wise area under different fruits in District Shimla up to 31-3-2007

Name of fruit	Mashobra	Narkanda	Theog	Rampur	Jubbal- Kotkhai	Rohru	Chirgaon	Chopal	Basantpur	Total
Apple	1164.52	4462.9	3421.76	3181.11	5857.05	4682.59	2830.97	2847.66	643.71	29092.27
Apple Spur	146.8038	188.23	198.38	186.98	286.54	198.86	153.13	174.22	40.87	1574.014
Plum	74.97	85.03991	93.15692	146.48	11.84167	75.66527	32.31	31.07	49.57	600.1038
Peach	76.31	15.05	59.89894	23.52	23.33948	15.46203	16.19927	25.24	49.06	304.0797
Apricot	94.41	70.03	83.33	122.47	57.31	90.35588	38.78249	53.43	59.04	669.1584
Pear	255.69	98.13	221.85	80.22	456.4011	87.05	71.26	97.87	112.67	1481.141
Cherry	12.44	134.26	22.88	17.49	34.9	10.83	1.96	4.05	2.302296	241.1123
Kiwi	1.85	1.96	1.76	1.28	3.63	2.18	0	0.83	0.96	14.45
Pomegranate	28.27	15.46	11.94063	1.95	4.207539	1.583607	0	6.276631	16.15	85.8384
Olive	7.42	0	10.03	0	0	1.3	0	10.16	1.44	30.35
Persimmon	1.54	1.43	2.31	2.56	4.79	2.22	1.98	2.85	7.45	27.13
Strawberry	0	0	0	0	0	0	0	0	0	0
Almond	161.49	150.207	382.0317	193.0013	203.6973	86.35246	131.8307	113.3338	101.06	1523.004
Walnut	20.24	43.01	22.95	80.71	16.03	36.51	44.55	33.42	10.25	307.67
Pecannut	2	4	0	0	0	0	0	0	0	6
Hazelnut	0	1.27	0.37	0.18	0.93	0.37	1.41	0.41	0	4.94
Mango	64.07	82.6689	0.24616	42.83	0	0	0	12.15251	76.16	278.1276
Litchi	5.74	9.49	0	0.26	0	0	0	0	12.5	27.99
Guava	3.53	0.97	0	1.91	0	0	0	0	11.17	17.58
Anola	2.58	0	0	0	0	0	0	17.89	4.18	24.65
Jackfruit	0.48	0	0	0	0	0	0	0	1.61	2.09
Papaya	0	0	0	0	0	0	0	0	0.53	0.53
Grapes	1.8	1.43	0.22	0	0	0	0	0	3.29	6.74
Loquat	1.3	0	0	0.4	0	0	0	0	1.2	2.9
Karonda	0	0	0	0	0	0	0	0	0	0
Ber	0.4	0	0	0	0	0	0	0	0.5	0.9
Chicoo	0	0	0	0	0	0	0	0	0.08	0.08
Fig	0	0	0	0	0	0	0	0	0	0
Banana	1	0	0	0	0	0	0	0	1	2
Jamun	0	0	0	0	0	0	0	0	0	0
Bael	0	0	0	0	0	0	0	0	0	0
Deon	0	0	0	0	0	0	0	0	0	0
Orange/Kinnow	1.57	5.15	6.15	9.14	0.45	0	0	1.37	12.13	35.96
Malta/Musambi	0	0.28	0	0	0	0	0	0	0	0.28
Kagzi Lime	167.8	16.64	26.28	35.9	16.07	13.08	2.22	7.63	174.64	460.26
Galagal	17.97	4.41	6.67	13.19	9.23	5.17	0.84	3.13	14.45	75.06
Grape fruit	0	0	0	0	0	0	0	0	0	0
Total	2316.194	5392.016	4572.214	4141.581	6986.417	5309.579	3327.443	3442.993	1407.972	36896.41

Annexure Table-2: Block-wise Area of Frits in District Shimla

(Area in Hectares)

Block	2006-07	2007-08	2008-09	2009-10	2010-11
Mashobra	2316.194	2371.44	2407.74	2475.85	2534.37
Narkanda	5392.016	5411.51	5477.68	5543.09	5614.04
Nankhari	-	-	1867.95	1990.82	2204.33
Theog	4572.214	4641.78	4706.93	4795.33	4867.89
Rampur	4141.531	4419.89	2807.59	2970.47	3290.54
Jubbal & Kotkhai	6986.417	6983.54	7167.97	7425.94	7673.61
Rohru	5309.579	5339.43	5526.47	5655.1	5685.89
Chirgaon	3327.443	3551.85	3633.58	4207.82	4278.89
Chopal	3442.993	3460.19	3535.47	3614.00	3672.92
Basantpur	1407.972	1443.82	1487.24	1497.96	1506.36
Total	36896.41	37623.46	38618.52	40176.38	41328.84

Source: Directorate of Horticulture, H.P.

Annexure Table-3: Block-wise Area of vegetables in District Shimla during 2010-11

(Area in Hectares)

Block	Vegetables		
	Area Under Potato	Area Under Other vegetables	Total Vegetable
Mashobra	173	2187	2360
Basantpur	45	769	814
Narkanda	324	79	403
Theog	469	2575	3044
Rampur	419	1047	1466
Nankhari	231	263	494
Jubbal	404	431	835
Rohru	2372	666	3038
Chirgaon	680	1290	1970
Chopal	460	1601	2061
Shimla	5332	11153	16485

Source: Office of Deputy Director, Department of Agriculture, District, Shimla.

Annexure Table-4: Block-wise Area of Flowers in District Sirmaur

(Area in Hectares)

Block	2009-10	2010-11	2011-12
Nahan	14	25	40
Paontasabib	48	80	104
Pachhad	53	53.16	57.57
Sangrah	15	20	38
Shillai	11	13	25
Rajgarh	212.85	212.68	230.84

Annexure Table-5: Block-wise Area of Condiments and Spices in District Sirmaur

(Area in Hectares)

Block	2009-10	2010-11	2011-12
Nahan	650	845	910
Paontasabib	842	955	1265
Pachhad	610	610	690
Sangrah	600	780	845
Shillai	760	805	890
Rajgarh	750	840	900

INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE

Dr. V K R V Rao Road, Nagarabhavi PO: BANGALORE-560 072

Telephone: 91-80-23217012, 23215468, 23215519, 23215592, Ext. 213, 09810679420 (Mobile) FAX: 91-80-23217012, 23217008
E-mail pkumar@isec.ac.in , Web: www.isec.ac.in

Dr. Parmod Kumar
Professor & Head, ADRTC

August 25, 2013

To

Dr. Ranveer Singh
Officer Incharge
Agro Economic Research Centre
Himachal Pradesh University
Shimla - 171005
Himachal Pradesh

Subject: Comments on the Draft Report on Baseline data on Horticulture – Himachal Pradesh

Dear Dr. Ranveer

This has reference to your submitting draft report titled, **Baseline Data on Area, Production and Yield of Horticulture Crops In Himachal Pradesh** for review. I am hereby enclosing Coordinator Centre's comments on the same prepared by my Colleague Dr. Komol Singha. Kindly revise the draft report and incorporate all the points raised in details below. After revision submit the final report for consolidation at the earliest. Also submit a soft copy of the report in a CD drive along with all the cleaned data of primary survey – household and village as well as secondary data used in drafting the report. Kindly do the needful at the earliest.
Kindly acknowledge the receipt

Thanking you

Kind Regards,

(Parmod Kumar)

Copy to
Ms. Aleyama Sebastian
Deputy Economic Adviser (AER)
Ministry of Agriculture, Dept. of Agriculture and Cooperation
Directorate of Economics & Statistics,
AER Division, Room No 103, F Wing, Shastri Bhavan,
New Delhi- 110011.

BASELINE DATA ON AREA, PRODUCTION AND YIELD OF HORTICULTURE CROPS IN HIMACHAL PRADESH

Kindly provide us with the information mentioned below, to make uniformity with other reports and compatible with the chapter scheme prepared.

Chapter – II

- APY of entire horticulture sector should be given year-wise uniformly, not TE for HP
- APY of entire horticulture sector should be given year-wise uniformly for district level
- You should have given secondary time series uniform data for entire fruit (not limiting to apple), vegetable, spices (not limiting to ginger) and flower (not limiting to Chrysanthemum), even if you limit yourself to the four crops that you have selected for the study
- Provide complete Five Year Plan investments in Horticulture for Himachal Pradesh.

Chapter – III

- Cropping pattern should be elaborately given for all the crops grown in the selected districts of study, as a percentage to Gross Cropped Area.

Chapter – IV

- Number of households having kitchen garden should be elaborated and should be given for all the sample villages selected for study. (e.g. in table 4.3 and 4.4 area and No. of plant are not given)

Chapter – V

- ✓ Please fill up the all the tables– villages and the crops you have selected for the present study

Chapter – VI

- Distribution of Irrigated Land Area by Source and Season-wise should be given.

- Types of Land used (common land, private land…) for different Horticultural Crops should be given.
- The information related to the Data Collecting Agencies and the Crops Covered with Area, Production and Yield of Horticulture Crops of the survey Year should be given.
- Is your data of vegetable including all vegetables? If so, add up rabi and kharif and provide total vegetable
- In table 6.1 APY of fruit (apple) should be given for all villages that you have selected for the study and do not mix up with other crop, give separately for apple

Chapter – VII

- Provide the crops (local crops that provide substantial income) that have not been included while estimating horticulture crops by the agencies.

We will be happy if you follow the template (chapter scheme) that has been sent to you and refer the Assam's report for the sake of uniformity

ACTION TAKEN BY THE AUTHOR ON THE COMMENTS OF THE COORDINATOR CENTRE FOR THE STUDY ENTITLED

BASE LINE DATA ON AREA, PRODUCTION AND YIELD OF HORTICULTURE CROPS IN HIMACHAL PRADESH

The comments received from the coordinator of the study have been addressed and detailed below for quick reference.

Chapter-II

1. Data related to Area, Production and Yield of Himachal Pradesh have been included in the chapter as per communication of coordinator of august 25, 2013.

2. Area, Production and Yield year wise of entire horticulture sector for district level have been included in this chapter.

3. Time series data for entire fruits, vegetables, spices and flowers have been included in the study.

4. Actual expenditure for scheme as a whole has been given in the study because it is clarified by the departments that the crop-wise information on actual expenditure is not available with the departments.

Chapter-III

1. Cropping pattern for all grown crops in the selected districts has been included as per communication of coordinator of the study.

Chapter-IV

1. The area of crops has been estimated and included in Table 4.3. As far as number of plants is concerned it is difficult to estimate the number of plants for some crops. As far

as Table 4.4 is concerned it is clear from the table that no farmer is growing horticulture crops on filed bunds.

Chapter-V

1. The information related to Area, Production and Yield has been included in the table 5.3.

Chapter –VI

1. Distribution of irrigated land by source and season wise has been given in Table 6.8.
2. It was observed during the survey that all households were growing the crops on private land (P.77).
3. The information related to the data collecting agencies and the crops covered with area, production and yield has been included in table 5.3. And the survey year has been given in chapter one on page 6.
4. The data is of all vegetables and that has been added altogether (Rabi and Kharif).
5. There was selected one village for the study for apple crops in Himachal Pradesh.

Chapter –VII

All the horticultural crops in the villages under study have been included by the state agencies for estimating area, production and yield and this chapter has been removed.

29th October 2013 Ranveer Singh