PRODUCTION AND MARKETING OF FLOWERS AND VEGETABLES UNDER PROTECTED CULTIVATION KIN HIMACHAL PRADESH

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EXECUTIVE SUMMARY

Introduction

The greenhouse technology is still in its preliminary stage in the country and concerted efforts are required from all concerned agencies to bring it at par with the global standards. Globalization coupled with economic liberalization will help in achieving the desired results. Concerted and continuous efforts are required to develop the required indigenous technology suitable for our country rather than going in for blind copying of the western technology. Economically viable and technologically feasible greenhouse technology suitable for the Indian agro climatic and geographical conditions is needed at the earliest.

Objectives

1. To study the progress in providing assistance for establishing the polyhouse for cultivation of flowers and vegetables under the programmes in Himachal Pradesh.
2. To examine the expenditure incurred in establishment of poly houses for cultivation of Flowers and vegetables under protected conditions in the State.
3. To study the economics of production of Flowers and vegetables under protected conditions in the State.
4. To analyse the marketing systems adopted for marketing of Flowers and vegetables produced under protected conditions in the State.
5. To examine the problems faced by the farmers in production and marketing of Flowers and vegetables under protected conditions in the State.

Methodology

Three districts viz. Chamba, Bilaspur and Shimla have been purposely selected on the basis of highest number of poly-houses. From the selected districts one development block each has been selected, again on the basis of highest number of poly-houses. All the registered poly-houses were listed and a sample of 50 growers of vegetables and flowers was randomly selected. Thus, the study has been based on 50 farmers each cultivating in poly-houses in three districts. The sample has

been classified into three size classes on the basis of the size of the polyhouses, covering an area of about 250 square meters, 500 square meters and 1000 square meters. These sizes were termed as small, medium and large categories, respectively. The sample was classified according to these size classes. The study is based on 150 polyhouse cultivators; 48 belonging to small, 58 medium and rest 44 to large category. The study refers to the agriculture year 2010-11.

Main findings

The average family size among all the sampled polyhouse farmers was 5 persons. About 86 percent of the people were found to be literate and out of total persons maximum had educational qualifications of senior secondary level. Agriculture was the main occupation of the majority of the individuals and this was also the prime subsidiary occupation. On an average total holding was 1.08 ha at the aggregate level of which maximum area was cultivated. The proportion of income, from sources other than agriculture, was the maximum from salary followed by animal husbandry.

Friends and relatives were the most important source of information about the polyhouses however, for authentic and detailed information; vast majority resorted to the department. The decision making process of the respondents was influenced by variety of motivational factors and hindrances they encountered during this stage. Majority of polyhouse construction was supervised by the authorities and they had supportive attitude towards the farmers. The farmers were vigilant and came out with variety of suggestion for improving the present scenario of polyhouse scheme in the State. Farmers had installed many types of equipment in polyhouses which are important for ensuring high productivity and quality of products. Sometimes the farmers deviated from the approved design mainly because of financial stringencies and such deviations were not significant.

Costs and returns from protected and unprotected cultivation indicates that the cost of carnation cultivation at overall level was ₹ 126102 per polyhouse and yielded a net return of ₹ 1749 per box with an input-output ratio of 1:2.01. Similarly, cost of capsicum cultivation at overall level was ₹ 41477 per polyhouse and yielded a net return of ₹ 258 per box with an input-output ratio of 1:2.26. The cost of tomato cultivation at overall level was ₹ 35255 per polyhouse and yielded a net return of ₹

335 per box with an input-output ratio of 1:3.17. In addition to this, the costs of cultivation of crops like wheat, maize, cauliflower, cabbage, peas and beans were worked out for comparison with the returns from crops grown under protected conditions. The cost of cultivation of these crops were ₹ 20070 per ha for wheat, ₹ 18091 per ha for maize, ₹ 53511 per ha for cauliflower, ₹ 38342 per ha for cabbage, ₹ 33461 per ha for peas and ₹ 32562 per ha for beans. The productivity of these crops along with total per farm production and the value of production were also worked out. The returns from protected cultivation are significantly higher than that of unprotected crops.

The crops grown under the protected environment are the commercial crops and as such majority of produce is marketed mainly in Delhi followed by markets of neighbouring States and local markets. This pattern has emerged due to price scenarios which are highest in Delhi market for all the three crops. Small fraction of total vegetables produced is retained for home consumption. As the Delhi market is most important from price and quantity marketed points of view, marketing costs and margins etc have been worked out for this market only. It was found that in carnation the price paid by consumer for 100 spikes was ₹ 909 and net price received by producers was 37.40 per cent of this. These figures for capsicum were ₹3093 per quintal and 65.79 per cent and for tomato ₹ 2648 per quintal and 59.74 per cent, respectively. Total marketing cost for carnation was ₹ 107 and marketing margins were ₹ 302 per 100 spikes. The marketing costs for capsicum and tomato were ₹ 506 and ₹609 respectively and margins were ₹ 512 and ₹ 457, respectively. The analysis for quantifying the production losses was also carried out for all the size categories of farmers. The pre harvest losses at overall level were of the tune of 1.54, 1.00 and 0.78 per cent for carnation, capsicum and tomato, respectively.

Although the farmers responded positively to income and employment issues related with polyhouse farming, the activity is not free from problems. The polyhouse farmers face many problems in relation to construction of polyhouses, input availability, cropping practices and harvesting. Most important problems being faced by almost all the farmers were about packing/processing and marketing of produce.

Suggestions and policy implications

Work should be channelized in finding suitable and locally available construction material for low and medium cost greenhouses. Efforts should be made to synthesize energy conservation principle along with environmental safety on a broader perspective. Adequate technology for environment control needs to be developed. In this perspective, the utilization of "Renewable Energy Resources" for meeting the energy requirements of the green house needs special mention. Utilization of the solar energy stored in the solar photovoltaic cell or else for greenhouse heating and humidity control needs to be improved. A fair amount of work on utilization of the solar energy for greenhouse heating has been done at Division of Agricultural Engineering at I.A.R.I., Pusa, New Delhi. The ministry of Renewable Energy Resources, Govt. of India is providing necessary assistance and it is expected that this will continue in future also.

Environmental considerations in future will demand that the greenhouse technology of the 21st century is of the closed type with complete recycling of everything except the crop produced. Thus, greater impetus should be provided for the deployment of gadgets and implements for efficient cropping operation, manure and fertilizer application and crop protection. Micro-processor controlled computer based environment control system needs to be developed.

Greater dissemination of information with appropriate Information Education and Communication (IEC) support about greenhouses among the farming community in the State coupled with greater infrastructural and marketing support will lead in achieving high annual growth rates of area under greenhouse cultivation.

The big and progressive farmers or flower grower associations should be encouraged to undertake construction of high tech polyhouses at par with global standard for growing high value vegetables for export purposes in order to boost the income of the f

Government initiatives/efforts in popularizing the greenhouse technology among the farming community are to be strengthened. There is a need for the Government to encourage the farmers by providing timely subsidy for taking up this new technology in a big way.

EXECUTIVE TABLE

#	Particulars	Category of farmers			
		Small (250 M^2)	**Medium (500 M^2)**	**Large (1000 M^2)**	**Overall**
1	No. of sampled polyhouses	48	58	44	150
2	Family size (No.)	5.40	5.35	4.50	5.00
3	Literacy rate (%)	78	89	90	86
4	Land holding (Ha)	0.85	1.22	1.13	1.08
5	Total annual income from other sources (₹/farm)	121090	183461	58928	126973
6	Cost of polyhouses (₹)	126485	373680	682559	385182
7	Amount of subsidy (₹)	82500	162500	325000	184567
8	**Returns from protected cultivation**				
a	Gross returns from carnation (₹)	389610	1256580	2886660	1548855
b	Net returns from carnation (₹)	151680	636968	1558240	777732
c	Gross returns from capsicum (₹)	71550	142140	303525	144666
d	Net returns from capsicum (₹)	43261	77787	170871	80791
e	Gross returns from tomato (₹)	104850	225968	453250	224099
f	Net returns from tomato (₹)	67110	147390	305360	153361
9	**Production of crops under protected cultivation**				
a	Carnation (Boxes of 900 spikes)	117	358	812	447
b	Capsicum (Boxes of 20 Kg.)	159	309	639	313
c	Tomato (Boxes of 25 Kg.)	433	464	875	394
10	**Costs and prices under protected cultivation per box**	**Carnation**	**Capsicum**	**Tomato**	
	Production cost (₹)	1734	204	155	
	Marketing cost (₹)	1440	62	90	
	Producers' share (%)	37.40	65.79	59.74	
11	**Losses (%)**				
	Pre-harvest	1.54	1.00	0.78	
	Post-harvest	3.46	2.24	2.12	

Chapter – 1
INTRODUCTION

1.1 Preamble

As a result of globalization of trade and liberalization of Indian economy, there is an immense scope for export of high value flowers and vegetables from India, besides, meeting the increased demand in domestic market. The need of the hour is to increase the productivity and quality of produce to meet the demand of quality conscious consumers. A breakthrough in production technology that integrates market driven quality parameters with the production system, besides ensuring a vertical growth in productivity is required. One such technology is "Protected cultivation", or generally called greenhouse technology. It is the technique of providing favourable environmental conditions to the crop. It is rather used to protect plants from the adverse climatic conditions by providing optimum conditions of light, temperature, humidity, carbon dioxide, etc. and by adopting modern techniques like micro irrigation, application of chemical fertilizers etc. for the best growth of the plants to achieve maximum yield and superior quality. In India protected cultivation on commercial scale was started during early nineties and Karnataka is one of the leading States in adopting this technology.

Protected cultivation practices can be defined as a cropping technique wherein the micro climate surrounding the plant body is controlled partially/ fully as per the requirement of the plant species. With the advancement in agriculture various types of protected cultivation practices suitable for a specific type of agro-climatic zone have emerged. Among these protective cultivation practices, green house/poly house cum rain shelter is useful for the hill region. This is not new technology and is more than 200 years old. The Europeans were considered the pioneers in this field. This technology provides the benefits that it makes possible to grow plants anywhere in the world at any time of the year i.e. crops could be grown under the inclement climatic conditions when it would not be otherwise possible to grow crops under the open field conditions. Simultaneously, the crop yields are at the maximum level per unit area, per unit volume and per unit input basis. It makes possible the production of higher quality products which are free from insect attack, pathogens and chemical residue which are fit for export markets. This means that income from the small and

the marginal land holdings maintained can be increased by producing crops meant for the export markets. It can be used as an effective strategy to generate self employment for the educated rural youth in the farm sector.

1.2 Principles of protective cultivation:

The green house is generally covered by transparent or translucent material such as glass or plastic. The green house covered with simple plastic sheet is termed as poly house. The green house generally reflects back 43% of the net solar radiation incident upon it allowing the transmittance of the "photosynthetically active solar radiation" in the range of 400-700 Nm wave length.

The sunlight admitted to the green house is absorbed by the crops, floor and other objects. These objects in turn emit long wave thermal radiation in the infra red region for which the glazing material has lower transparency. As a result the solar energy remains trapped in the green house, thus raising its temperature. This phenomenon is called the "Green house Effect". **This condition of natural rise in green house air temperature is utilized in the cold regions to grow crops successfully**. However in the summer season due to the above Stated phenomenon ventilation and cooling is required to maintain the temperature inside the structure well below 35^0C. The ventilation system can be natural or a forced one. In the forced system fans are used which draw out 7-9m^3 of air / sec / unit of power consumed and are able to provide 2 air changes / minute. The various types of cooling systems employed are as follows:

A. Roof Shading
B. Water film covering
C. Evaporative cooling which includes the following:
    i) Fan and pad cooling
    ii) High pressure mist system
    iii) Low pressure mist system

However in the cold regions like many areas of Himachal Pradesh, natural ventilation is sufficient to maintain the desired temperature in the poly house. This can be achieved using the agro-shade net or by providing doors (on opposite sides) in order to facilitate cross ventilation.

1.3 Benefits of green house technology

The benefits which can be derived from the green house cultivation are as follows:

- Environment control allows raising plants anywhere in the world at any time of the year i.e. crops could be grown under the inclement climatic conditions when it would not be otherwise possible to grow crops under the open field conditions.
- The crop yields are at the maximum level per unit area, per unit volume and per unit input basis.
- The control of the microcosm allows the production of higher quality products which are free from insect attack, pathogens and chemical residue.
- High value and high quality crops could be grown for export markets.
- Income from the small and the marginal land holdings maintained by the farmer can be increased by producing crops meant for the export markets.
- It can be used to generate self employment for the educated rural youth in the farm sector.

1.4 Present scenario

Farmers are also utilizing low and medium cost greenhouses for raising potted plants and seedlings in the nursery. In the Northern Gangetic plains especially in Punjab, Haryana and Uttar Pradesh, the farmers are using this technology to raise healthy seedlings of high yielding crop varieties so that they can be transplanted early in the fields during the onset of the spring season so as to capture the early markets and thus reap higher returns. In the North Eastern States, especially in Assam, efforts are on to raise vegetable crops in the greenhouse-cum-Rain Shelter Structures during the long south west monsoon periods. In these regions stress is being given for the development of low cost greenhouses using bamboo frame structures as these construction materials are readily available in these regions. The results obtained in this regard from the concerned agricultural universities are encouraging.

1.5 The need

The greenhouse technology is still in its preliminary stage in the country and concerted efforts are required from all concerned agencies to bring it at par with the global standards. Globalization coupled with economic liberalization will help in achieving the desired results. Concerted and continuous efforts are required to

develop the required indigenous technology suitable for our country rather than going in for blatant aping of the western technology. Economically viable and technologically feasible greenhouse technology suitable for the Indian agro-climatic and geographical conditions is needed at the earliest.

1.6 The present study

Now-a-days the much needed vegetables are being grown throughout the year in all climates. Production of brinjal, capsicum, tomato and other cucurbits is taken in the summer months on a large scale, whereas the green leafy vegetables are being grown in the long frozen winter months. The quality of flowers produced in open fields is not of international standards. So, protected cultivation needs to be standardized. Low cost technologies, required on small holdings, should be developed. There is a strong need for developing the required minimum infrastructure in major production zones to be used by growers on community/cooperative basis. The small growers are thus unable to invest in expensive systems of this nature.

With this background the present study has been planned with the following specific objectives:

1.7 Objectives

6. To study the progress in providing assistance for establishing the polyhouse for cultivation of flowers and vegetables under the programmes in Himachal Pradesh.
7. To examine the expenditure incurred in establishment of poly houses for cultivation of Flowers and vegetables under protected conditions in the State.
8. To study the economics of production of Flowers and vegetables under protected conditions in the State.
9. To analyse the marketing systems adopted for marketing of Flowers and vegetables produced under protected conditions in the State.
10. To examine the problems faced by the farmers in production and marketing of Flowers and vegetables under protected conditions in the State.

1.8 Plan of study

The present study has been divided into nine chapters. The subject matter of the first chapter is introducing the problems and presents the objectives of the study. The second chapter highlights the methodology adopted for the study and classification of the sample etc. In the third chapter present scenario of polyhouse cultivation in the State has been presented taking into consideration various schemes etc available to farmers for adoption of this technology. The socioeconomic features of the sampled polyhouse farmers have been presented in fourth chapter. Fifth chapter concentrates on motivational factors and hindrances encountered by the farmers during the whole adoption and construction process and the costs involved in its construction. Costs and returns from crops grown in the protected environment forms the sixth chapter of the study. In the seventh chapter the marketing system of the protected crops has been presented. Eighth chapter highlights various problems encountered by farmers in various operations and stages of cultivation. Conclusions and policy implication of the study have been presented in the ninth chapter of the study.

Chapter – 2

METHODOLOGY

The present chapter deals with the selection procedure adopted for finalizing the sample for detailed study. During this exercise, care has been taken to make the sample as representative of the population as possible so that the findings based on sample could be applied for the population as a whole without significant error. The following presents the details of the sampling technique adopted.

Pic.-1: A distant view of polyhouse in remote village of district Chamba.

2.1 Selection of Study District and Blocks

Three districts viz. Chamba, Bilaspur and Shimla have been purposely selected on the basis of highest number of poly-houses. From the selected districts one development block each has been selected, again on the basis of highest number of poly-houses. The details have been presented in Table-2.1. All the registered poly-houses were listed and a sample of 50 growers of vegetables and flowers was randomly selected. Thus, the study has been based on 50 farmers each cultivating in poly-houses in three districts.

Table-2.1: Selection area of the sample

District	Blocks	Villages
Bilaspur	Bilaspur Sadar	I. Jukhala II. Panjgain III. Kandror IV. Beri V. Kothipura
Chamba	Tissa	I. Dikravind II. Kadvas III. Modah IV. Gauri V. Pujthla VI. Gadiarar VII. Satloga VIII. Iluwal
Shimla	Theog	I. Sainj II. Fagu III. Bhekhalti IV. Theog

2.2 Classification of sample

The sample has been classified into three size classes on the basis of the size of the polyhouses. It was observed during the survey that predominantly there are three sizes of polyhouses in the State. These are polyhouses covering an area of about 250 square meters, 500 square meters and 1000 square meters. These sizes were termed as small, medium and large categories, respectively. The sample was classified according to these size classes and the detailed distribution has been presented in Table 2.2. The study is thus, based on 150 polyhouse cultivators; 48 of which belonged to small, 58 to medium and rest 44 to large category. The sample distribution in percentage form has been presented in Table 2.3.

Table-2.2: Classification of sample ployhouse owners.

(No.)

District	Size class			Total
	Small	Medium	Large	
Bilaspur	0	16	34	50
Chamba	35	12	3	50
Shimla	13	30	7	50
Total	48	58	44	150

Table-2.3: Classification of sample ployhouse owners.

(%)

District	Size class			Total
	Small	Medium	Large	
Bilaspur	0.00	32.00	68.00	100.00
Chamba	70.00	24.00	6.00	100.00
Shimla	26.00	60.00	14.00	100.00
Total	32.00	38.67	29.33	100.00

2.3 The Data

Both secondary as well as primary data has been used in this study. The secondary information was collected from the various levels of administrative machinery of the State. It includes the records maintained at block, district and State levels.

2.4 Analytical Tools

In general, to make the analysis simple and more understandable, tabular analysis has been used.

2.5 Limitations of the Study

This study suffers from some limitations, but it is hoped that quality of this report is not affected on this account. Some of the limitations are listed below:

- The farmers were not aware of the exact costs involved in polyhouse construction;
- It was difficult for the farmers to segregate the costs farm inputs incurred on various operations in the protected and open cultivation.

2.6 Reference Period

The study refers to the agriculture year 2010-11.

Chapter – 3

PRESENT SCENARIO OF POLYHOUSE DEVELOPMENT IN THE STATE

The area under polyhouses has been increasing continuously in the State. As per latest figures there was 98.22 hectares area under green/polyhouses with a total financial outlay of ₹ 2863.948 lakhs. Additional 7.91 hectares area was brought under low poly tunnels and an expenditure of ₹ 3.952 lakhs was made on this account. Polyhouse was also an important component of Macro Management Scheme and an area of 6.71 hectares was brought under polyhouses under this scheme. As such the total area of polyhouses in the State stands at 112.84 hectares.

The protected cultivation in the State is regulated by the provisions of Operational Guidelines of year 2010, issued by Government of India, Ministry of Agriculture. These operational guidelines are applicable for all the North East and Himalayan States. Activities like construction of shade net house, green houses, mulching, and plastic tunnels, anti bird/hail nets would be promoted under the Mission, and assistance for different components/sub components have been presented in Table 3.1. Provision has been made for selecting a variety of construction material for green houses and shade net houses. Separate provision has been made for meeting the cost of cultivation under green house and shade nets, which includes cost of planting material and inputs. Preference has been given to the use of locally available material, to minimize the cost of construction of such structures.

Table-3.1: Cost norms and pattern of assistance for polyhouses in Himachal Pradesh

Particulars	Maximum permissible cost	Pattern of assistance
Green House Structure		
Fan and pad system	₹1465/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary.
Naturally ventilated system		
Tubular Structure	₹935/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary.
Wooden Structure	₹515/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary.
Bamboo Structure	₹375/Sq. m	50% of the cost limited to 4000Sq.m per beneficiary.
Plastic Mulching	₹ 20,000/ha	50% of the cost limited to 2 ha per beneficiary
Shade Net House		
Tubular Structure	₹600/Sq. m	50% of the cost limited to 4000 Sq. M. per beneficiary.
Wooden Structure	₹410/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary.
Bamboo Structure	₹300/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary.
Plastic Tunnels	₹ 30/Sq. m	50% of the cost limited to 5000 Sq. m per beneficiary
Anti Bird/Anti Hail Nets	₹ 20/Sq. m	50% of the cost limited to 5000 Sq. m per beneficiary
Cost of planting material of high value vegetables grown in poly house	₹ 105/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary
Cost of planting material of high value flowers for poly house	₹ 500/Sq. m	50% of the cost limited to 4000 Sq. m per beneficiary
Precision Farming development and extension through Precision Farming Development Centres(PFDCs)	Project based	100% of the cost to PFDCs

Chapter – 4

SOCIOECONOMIC FEATURES OF POLYHOUSE OWNERS IN THE STATE

In this chapter, socio-economic characteristics of the sampled polyhouse farmers of Bilaspur, Chamba and Shimla districts have been discussed. Socio-economic conditions provide the basis for understanding the background of the sampled polyhouse farmers. Such conditions influence the processes followed in the production and marketing of produce to a great extent. It is in this context that the demographic structure i.e. size of family, sex ratio, education and economic factors like land utilization pattern, area under different fruits and number of plants in orchard etc have been discussed.

4.1 Family size

The population distribution of sampled households is given in Table 4.1 wherein it may be seen that the average family size at aggregate level was five members per family. This figure was almost same for small and medium farmers but lower for large farmers.

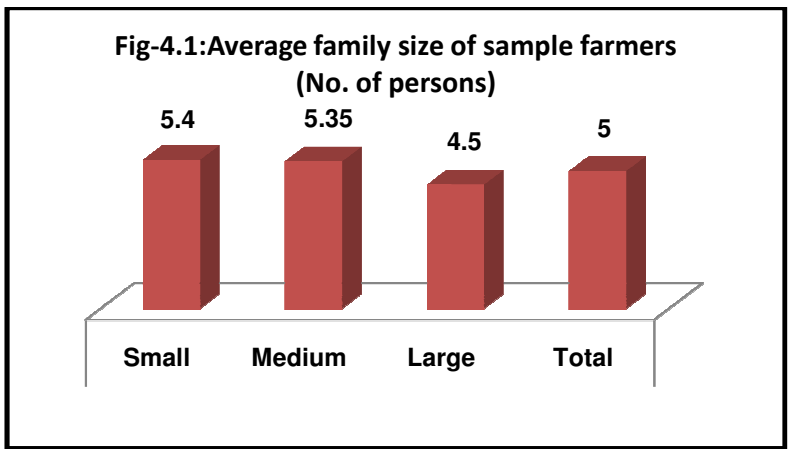


Table- 4.1: Average Family Size of sample Households

(No.)

Family Size	Category			
	Small	**Medium**	**Large**	**Total**
No. of persons	5.40	5.35	4.50	5.00

4.2 Educational Status

The proportion of literates in the given population is an indicator of the quality of manpower. The educational level of members of the sampled families has been presented in Table 4.2 which reveals that about 14 per cent population was illiterate. Among small category the percentage of illiterates was very high, 21.88 per cent but was about 11 and 10 per cent in case of medium and large farmers. The most prevalent standard of education was observed to be senior secondary level, about 31 per cent of the persons having attained this qualification followed by primary level education. There were about eight per cent graduates and about 10 per cent persons having qualification above graduation. Further category wise details can also be referred to from this table.

Fig-4.2: Literacy among sample households (%)

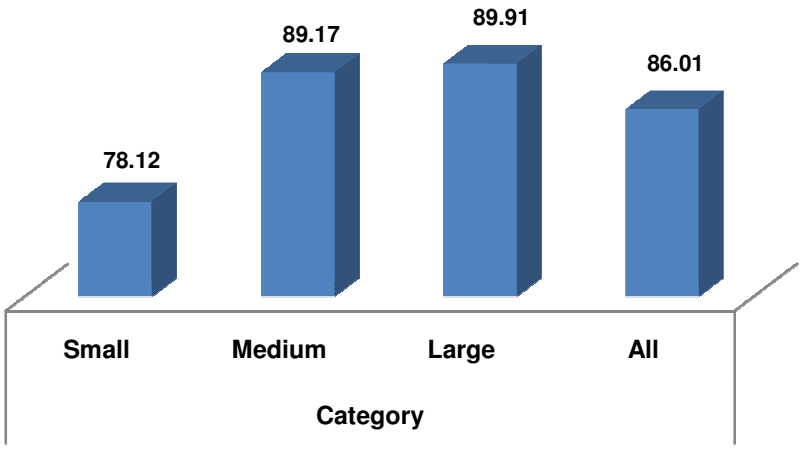


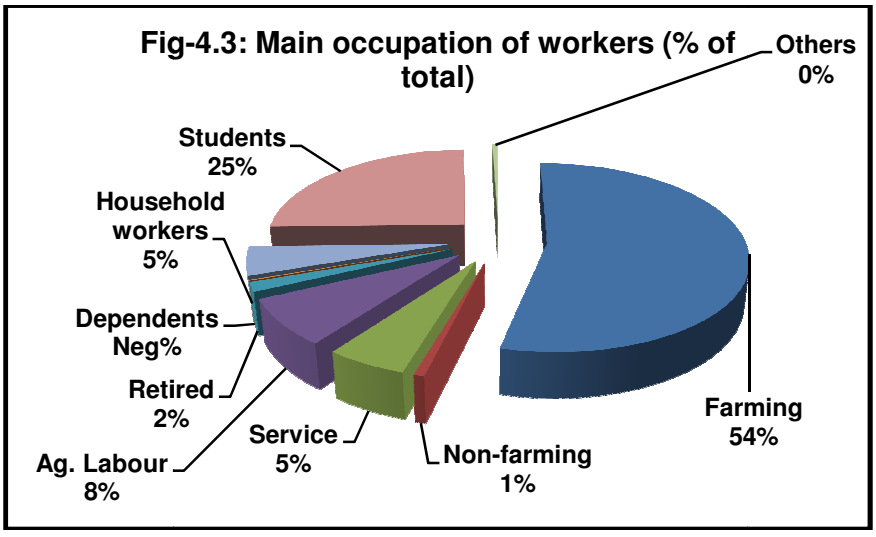
Table- 4. 2: Educational Level of Family Members of Sampled households.

(%)

Particulars	Category			
	Small	Medium	Large	All
Illiterate	21.88	10.83	10.09	13.99
Primary	23.21	23.83	20.18	22.50
Middle	13.39	16.97	11.84	14.27
Secondary	30.80	36.82	24.56	31.14
Graduates	6.25	6.86	11.84	8.23
Above graduation	4.46	4.69	21.49	9.88
Total	100.00	100.00	100.00	100.00

4.3 Occupational pattern

The workers in rural areas usually have more than one occupations, the main occupation and the subsidiary which is practised during the lean season of agricultural operations. Taking this fact into consideration the analysis has been divided into two parts; main and subsidiary occupations.



4.3.1 Main occupation: Main occupation of the sampled polyhouse farmers was analyzed and the results have been presented in absolute numbers (Table 4.3) and in percentages (Table 4.4). It was found that majority (54.59%) of the farmers

reported agriculture as their main occupation, followed by agricultural labour (7.86%) and service (5.53%). About 25 per cent of the total population was comprised by students and about 5 per cent reported household work to be their main occupation. Dependents and retired persons were also included in the analysis.

4.3.2 Subsidiary occupation: The number and proportion of workers undertaking any subsidiary occupation have been presented in Tables 4.5 and 4.6, respectively. Household work is the most common subsidiary occupation (12.52%), followed by agriculture (5.39%), and agriculture labour which was subsidiary occupation of 1.31 per cent persons. Further details can be referred to from the table.

Table-4. 3: Occupational Pattern of Sampled Households (Main occupation).

(No.)

Occupation	Category			
	Small	**Medium**	**Large**	Total
Farming	121	127	127	375
Service	14	21	3	38
Ag. Labour	1	45	8	54
Non-ag. Labour	0	0	0	0
Retired	6	5	0	11
Dependents	1	0	0	1
Household workers	6	12	16	34
Students	69	60	42	171
Others	0	1	2	3
Total population	218	271	198	687

Table- 4.4: Occupational Pattern of Sampled Households (Main occupation).

(%)

Occupation	Category			
	Small	**Medium**	**Large**	Total
Farming	55.51	46.87	64.14	54.59
Service	6.42	7.75	1.52	5.53
Ag. Labour	0.46	16.61	4.04	7.86
Non-ag. Labour	0.00	0.00	0.00	0.00
Retired	2.75	1.85	0.00	1.60
Dependents	0.46	0.00	0.00	0.15
Household workers	2.75	4.43	8.08	4.95
Students	31.65	22.14	21.21	24.89
Others	0.00	0.37	1.01	0.44
Total population	100.00	100.00	100.00	100.00

Table- 4.5: Occupational Pattern of Sampled Households (Subsidiary occupation).

(No.)

Occupation	Category			
	Small	**Medium**	**Large**	Total
Farming	11	14	12	37
Service	0	0	0	0
Ag. Labour	0	8	1	9
Non-ag. Labour	0	0	0	0
Retired	0	0	1	1
Dependents	0	0	0	0
Household workers	44	31	11	86
Students	1	1	0	2
Others	0	0	0	0
Total population	218	271	198	687

Table-4. 6: Occupational Pattern of Sampled Households (Subsidiary occupation).

(%)

Occupation	Category			
	Small	**Medium**	**Large**	Total
Farming	5.05	5.17	6.06	5.39
Service	0.00	0.00	0.00	0.00
Ag. Labour	0.00	2.95	0.51	1.31
Non-Ag. Labour	0.00	0.00	0.00	0.00
Retired	0.00	0.00	0.51	0.15
Dependents	0.00	0.00	0.00	0.00
Household workers	20.18	11.44	5.56	12.52
Students	0.46	0.37	0.00	0.29
Others	0.00	0.00	0.00	0.00
Total population	100.00	100.00	100.00	100.00

4.4 Land resources

Land being the primary factor of production, the economic activity of a region or a country, industrial or agricultural, mainly depends on the quantum of land resources available and the manner in which these are used. The land resources of the sampled farmers have been presented in Table 4.7 in absolute terms and in table 4.8 in percentage terms and indicate the extent of land use for cultivation and land under grasses etc. The perusal of the Table 4.7 reveals that the total land owned by average sampled farmer was 1.08 hectares which was 0.85 for small, 1.22 for medium and 1.13 hectares for large farmers. Out of this about 46 per cent was cultivated land (Table-4.8) and these figures were 24 for small, 56 for medium and 51 per cent for large farmers, respectively. The proportion of irrigated land was slightly higher at overall level but was lower than unirrigated land in case of small and large farmers. Grass land was about 54 per cent at over all level which was as high as 76 per cent in case of small farmers.

Table- 4.7: Land Resources of Selected protected Cultivators.

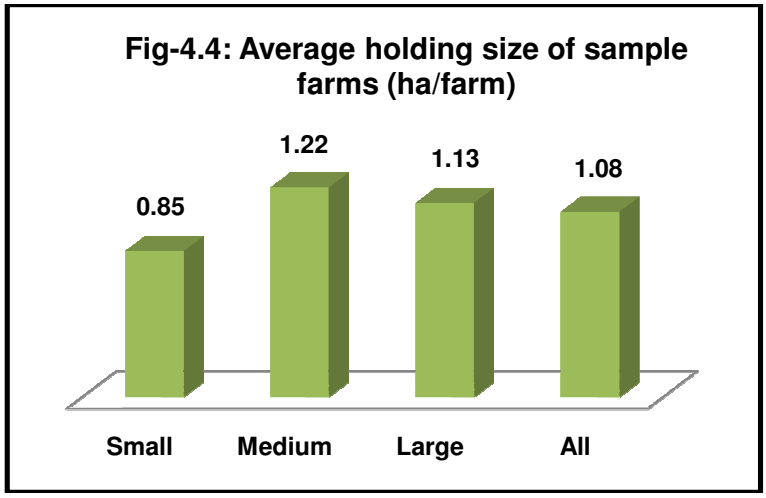
(Ha/Farm)

Particulars	Category			Overall
	Small	Medium	Large	
Total Land	0.85	1.22	1.13	1.08
Cultivated land	0.20	0.68	0.58	0.50
Irrigated	0.09	0.37	0.28	0.25
Un-Irrigated	0.11	0.31	0.30	0.25
Grass land	0.65	0.54	0.55	0.58

Table-4.8: Land Resources of Selected protected Cultivators.

(%)

Particulars	Category			Overall
	Small	Medium	Large	
Total Land	100.00	100.00	100.00	100.00
Cultivated land	23.53	55.74	51.33	46.03
Irrigated	10.59	30.33	24.78	23.52
Un-Irrigated	12.94	25.41	26.55	22.51
Grass land	76.47	44.26	48.67	53.97



4.5 Income from sources other than crop farming

In addition to income from farming, the farming households derive income from various other sources like animal husbandry, salary, business, agricultural and non-agricultural labour etc. The results of analysis in this respect have been presented in

Table 4.9, in absolute terms and in Table 4.10 in percentage terms. It can be seen from Table 4.10 that out of total income of all sampled polyhouse farmers, the proportion of income from salaries was maximum (56.86%) followed by animal husbandry (27.08%). The income from business accounted for only (4.20%) and from wage labour it was only 4.66 per cent. The analysis has also been carried out for individual size classes the results of which have also been presented in these tables.

Table-4.9: Per Farm Annual Income from Other Sources

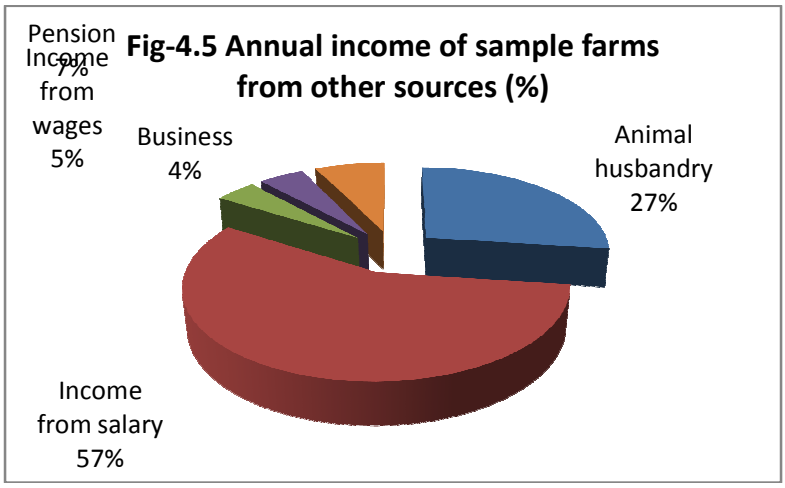
(Rs/farm/year)

Sources of income	Category			Overall
	Marginal	Small	Large	
Animal husbandry	26371	39825	35951	34383
Income from salary	70000	112241	21818	72200
Business	9375	6034	0	5333
Income from wages	344	14154	1159	5922
Pension	15000	11207	0	9133
Total income	121090	183461	58928	126973

Table-4.10: Per Farm Annual Income from Other Sources

(%)

Sources of income	Category			Overall
	Marginal	Small	Large	
Animal husbandry	21.78	21.71	61.01	27.08
Income from salary	57.81	61.18	37.02	56.86
Business	7.74	3.29	0.00	4.20
Income from wages	0.28	7.71	1.97	4.66
Pension	12.39	6.11	0.00	7.19
Total income	100.00	100.00	100.00	100.00



4.6 Summing up

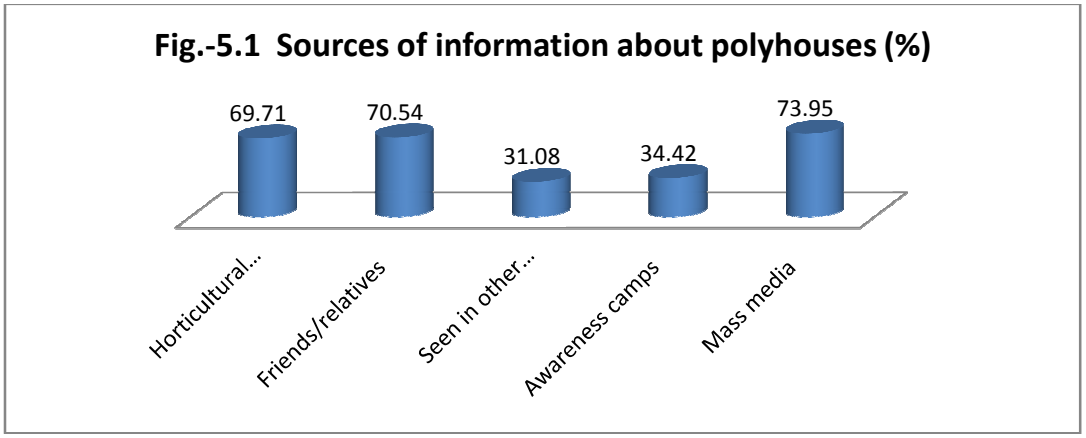
From the above analysis it can be concluded that average family size among all the sampled polyhouse farmers was 5 persons. About 86 percent of the people were found to be literate and out of total persons maximum (31.14%) had educational qualifications of senior secondary level. Agriculture was the main occupation of the majority (53.86%) of the individuals and this was also the prime subsidiary occupation. The analysis of land resources indicates that of the total holding of 1.08 ha at the aggregate level, maximum (46.03%) area was cultivated land. The proportion of income, from sources other than agriculture, was maximum (56.86%) from salary followed by animal husbandry (27.08%).

Chapter – 5

MOTIVATIONS/HINDRANCES AND COSTS INVOLVED IN POLYHOUSE CONSTRUCTION

Polyhouse is comparatively a new concept and technology for the farmers of the State. The starting point for the adoption of the technology is the information about it. After the farmers get the information about various aspects of the technology they analyse the pros and cons of it and then decide about its adoption. For adoption also, there are various motivations which help in making up the minds of farmers for its adoption. But simultaneously, there are various factors and situations which act as deterrent and may act as hindrances in adoption process slowing it down. In the worst cases, the farmers may get so dishearten that he may decide to abandon the adoption of the technology or the concept. It is with this background that the present chapter has been designed to cater all these factors.

5.1 Sources of information



There are various sources from which the farmers could have gathered the information about the possible benefits of polyhouses including the formalities for getting loans and other operational details. In majority of cases the respondents received information from more than one source and hence the analysis in this

respect is based on multiple responses. The results of analysis in this respect indicates that mass media was the main source of information, about 74 per cent of the respondents, at overall level, getting information from this source (Table-5.1). This was followed by friends/relatives (70.54%) and horticulture department (69.71%). However, detailed and authentic information was provided by the department only. The large farmers mainly depended upon department of horticulture for information in this regard. The class wise information is also provided in this table.

Table- 5.1: Sources of Information about Polyhouse

(%, multiple responses)

Sources	Category			Overall
	Small	Medium	Large	
Horticulture Department	62.50	53.45	93.18	69.71
Friends/relatives	43.75	72.41	95.45	70.54
Seen in other villages	41.67	37.93	13.64	31.08
Awareness camps	56.25	37.93	9.09	34.42
Mass media	56.25	72.41	93.18	73.95

5.2 Motivation Factors

Motivational factors are the situations or reasons which induce the respondents to adopt the activity. A list of such possible motivational factors was drawn and responses on such factors recorded. It was obvious to use the multiple response analysis as there was every chance of more than one factor being instrumental in inducing the respondent to adopt the activity. The results of the analysis have been presented in Table 5.2.

It was found that the possibility of high income from polyhouses was the largest factor motivating about 65 per cent of the respondents. About 60 per cent of the respondents were motivated by the fact that others were also installing the polyhouses and hence it is a preposition worth adoption. Hence, the demonstration effect played its role. Same percentage of the respondents adopted this activity due the fact that they had very low availability of water for irrigation and thought that low requirement of irrigation water in polyhouse makes it suitable for their operating circumstances.

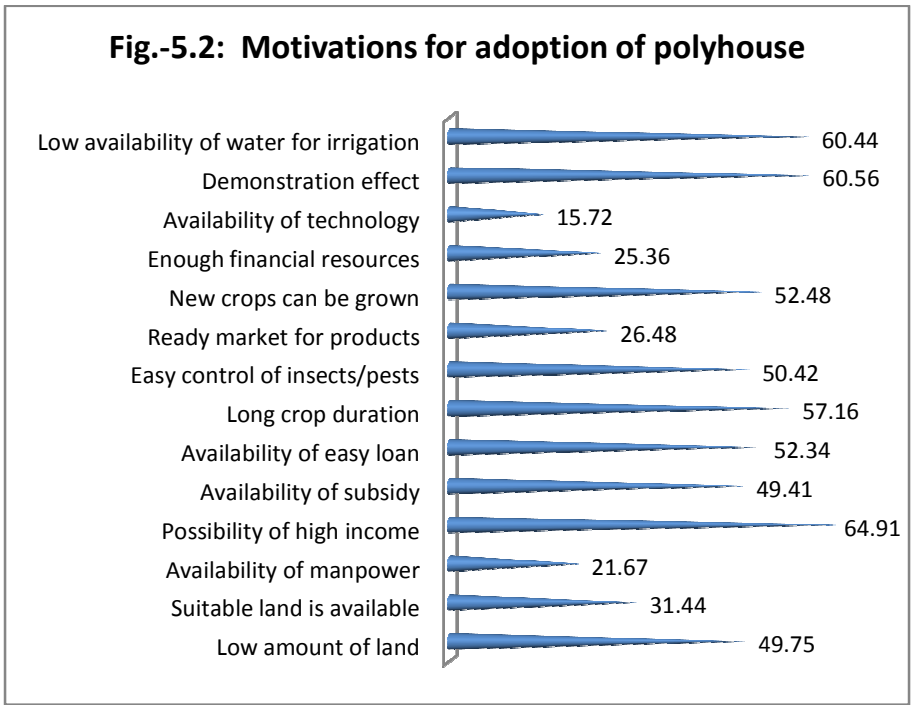
In addition to these important motivational factors, there were other equally compelling reasons like long crop during which motivated about 57 per cent of the

respondents. About 52 per cent respondents were motivated by the fact that easy loan was available along with generous subsidy. The reason quoted by about half of the respondents was that they had very low amount of land and by adoption of this technology they will be able to have more comprehensive use of scarce land. Various other motivational factors along with the percentage of respondents reporting these factors and category wise details can be referred to from this table.

Table-5.2: Motivation Factors for Adoption of Polyhouse

(%, multiple responses)

Sources	Category			Overall
	Small	Medium	Large	
Low amount of land	27.08	51.72	70.45	49.75
Suitable land is available	47.92	32.76	13.64	31.44
Availability of manpower	37.50	20.69	6.82	21.67
Possibility of high income	41.67	68.97	84.09	64.91
Availability of subsidy	37.50	44.83	65.91	49.41
Availability of easy loan	22.92	50.00	84.09	52.34
Long crop duration	39.58	56.90	75.00	57.16
Easy control of insects/pests	35.42	43.10	72.73	50.42
Ready market for products	41.67	24.14	13.64	26.48
New crops can be grown	31.25	53.45	72.73	52.48
Enough financial resources	35.42	29.31	11.36	25.36
Availability of technology	27.08	15.52	4.55	15.72
Demonstration effect	39.58	53.45	88.64	60.56
Low availability of water for irrigation	27.08	72.41	81.82	60.44



5.3 Hindrances in adoption

Despite the fact that the farmers are motivated for adoption of polyhouses, there are various hindrances and bottlenecks which the farmers encounter during the adoption process. The analysis of such factors is important from the point of view of streamlining and refining the programme for higher adoption rates and hence this could be instrumental in programme success. To carry out this analysis, a list of such possible hindrances was drawn and multiple responses on such factors recorded. The results of the analysis have been presented in Table 5.3

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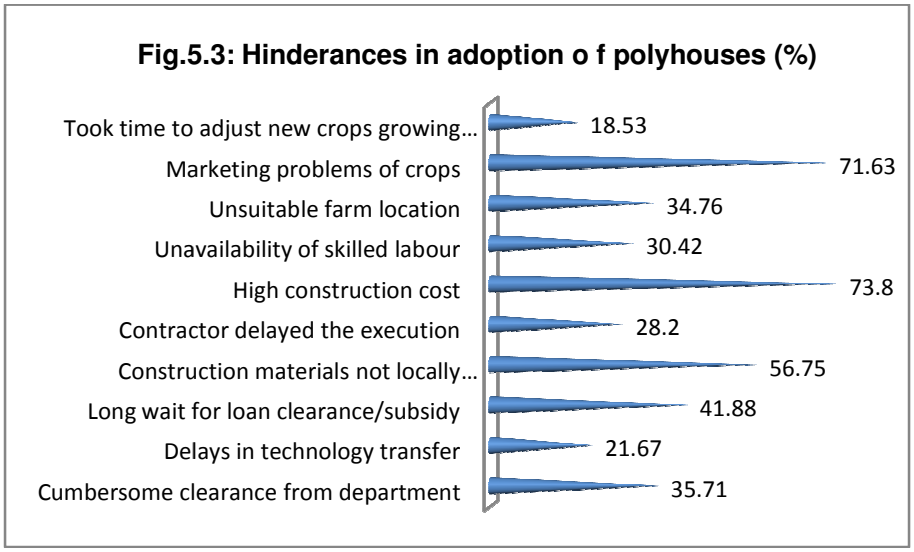
The results of the study indicate that the main obstacle in the whole process was the high construction cost of polyhouse (74% respondents) which discouraged them to augment the existing level of activity. This was followed by marketing problems as reported by about 72 per cent of the respondents. About 57 per cent respondents felt that the construction material is not locally available otherwise they could have made the polyhouse at their own level without waiting for clearance and subsidy etc from the department. The respondents also had complaints about clearance procedure of department which in their opinion was very long (42%) and cumbersome (36%). Various other hindrances encountered were delays in

technology transfer, delays on the part of contractor and unavailability of skilled labour etc.

Table- 5.3: Hindrances Encountered for Adoption of Polyhouse

(%, multiple responses)

Hindrances	Category			Overall
	Small	Medium	Large	
Cumbersome clearance from department	45.83	43.10	18.18	35.71
Delays in technology transfer	37.50	20.69	6.82	21.67
Long wait for loan clearance/subsidy	50.00	55.17	20.45	41.88
Construction materials not locally available	33.33	48.28	88.64	56.75
Contractor delayed the execution	41.67	29.31	13.64	28.20
High construction cost	60.42	65.52	95.45	73.80
Unavailability of skilled labour	27.08	48.28	15.91	30.42
Unsuitable farm location	56.25	27.59	20.45	34.76
Marketing problems of crops	39.58	77.59	97.73	71.63
Took time to adjust new crops growing technology	22.92	25.86	6.82	18.53



5.4 Departmental supervision

The department supervise the construction of polyhouses to ensure the adherence to approved design and quality control in the construction. The results indicate that at overall level 66 per cent of the polyhouses were supervised by the officials (table-5.4). It is encouraging to note that the attitude of officials during the supervision, in addition to ensure the quality and design aspects, was supportive to farmers. About 69 per cent respondents revealed that the attitude of officials was very supportive and praiseworthy. All the large farmers supported this view. Only about 31 per cent respondents felt the attitude to be neutral. The noteworthy outcome of the analysis is that none of the respondents found the attitude to be discouraging. This fact can go a long way in making not only this scheme a success but the future endeavours of the department as well.

Table-5.4: Departmental supervision of polyhouse construction and official

(% of farmers)

Particulars	Categories			Overall
	Small	Medium	Large	
Cases supervised	72.92	46.55	84.09	66.00
Attitude of officials				
- Supportive	27.08	79.31	100.00	68.69
-Neutral	72.92	20.69	0.00	31.37
-Discouraging	0.00	0.00	0.00	0.00

5.5 Farmers' suggestions for improvement of polyhouses

There were many farmers who had some suggestion for improving the sustainability and viability of present system. Such farmers came out with a few suggestions (Table-5.5). At overall level about 71 per cent of the respondents had some suggestions to make for improvement. This percentage was the highest among the large farmers. Majority of farmers (66%) felt that the design of the polyhouses should not be very rigid and the adaptation of design to local conditions should be incorporated in the system. About 63 per cent felt that some assistance in marketing should be provided, or it should be integrated with the scheme for making it more viable. About little more than 40 per cent respondents felt that the things will improve if some cost saving techniques is applied or made available, information on

cropping practices under protected conditions is provided, organic farming is introduced in polyhouses and farmers are trained on product processing and packaging.

Table-5.5: Suggestions for improvement of polyhouses

(% of farmers)

Particulars	Categories			Overall
	Small	Medium	Large	
Farmers with suggestions	75.80	56.30	86.09	71.28
Suggestions				
Adaptation of design to local conditions	73	47	84	66
Cost saving measures	15	35	84	43
Crops to be grown	0	31	84	37
Cropping practices	15	33	84	42
Sources of inputs	0	31	84	37
Organic farming	15	33	84	42
Product processing and packing	15	35	84	43
Storage techniques	15	35	84	43
Marketing assistance	47	63	81	63

5.6 Delays in No Objection Certificates

Many respondents felt that there are delays in granting of No Objection Certificate (NOC) from the department (Table 5.6) which could have been due to long departmental procedures or other priority assignments with the concerned officials. At overall level 67 per cent respondents revealed that they had to face some delay in granting NOC from the department due to which they had to face the financial hardships.

Table-5.6: Delays in No Objection Certificates (NOC)

(% of farmers)

Particulars	Categories			Overall
	Small	Medium	Large	
Farmers reporting delay	72.92	46.55	84.09	67.00
No delay reported	27.08	51.75	15.91	33.00

5.7 Action by contractor in case of delayed NOC

Only two per cent respondents at overall level reported some action by the contractor in case of delayed NOC (Table 5.7). All these respondents belonged to large category.

Table-5.7: Action by contractor in case of delay in NOC

(% of farmers)

Particulars	Categories			Overall
	Small	Medium	Large	
Action reported	0.00	0.00	6.82	2.00
No action	100.00	100.00	93.18	98.00

5.8: Equipments installed in polyhouses

There are various types of equipments installed in the polyhouses, especially in the polyhouses of high tech design. The results of analysis in this respect have been presented in Table-5.8. It was found that 68 per cent of polyhouses had humidifiers, sun shades, drip irrigation, fogger, water tank and Vermicompost pit installed/constructed along with the main structure. In addition to this, about 23 per cent reported installation of heaters and 35 per cent also the coolers.

Table-5.8: Equipments installed in polyhouses

(% of farmers)

Equipments installed	Categories			Overall
	Small	Medium	Large	
Heater	0.00	41.38	22.73	22.67
Cooler	27.08	51.72	22.73	35.33
Humidifier	27.08	77.59	100.00	68.00
Sun shade	27.08	77.59	100.00	68.00
Drip irrigation	27.08	77.59	100.00	68.00
Fogger	27.08	79.31	100.00	68.67
Water tank	25.00	77.59	100.00	68.00
Vermicompost pit	25.00	77.59	100.00	66.00

5.9 Deviation from recommended design

Some minor deviations from the recommended designs were reported by the polyhouse owners which were due mainly to three reasons (Table 5.9). The deviation in about 33 per cent polyhouses was due to financial constraints. About 16 per cent respondents did it on the recommendation of contractors which mainly was to accommodate the polyhouse on some sort of unsuitable shape of land parcel on which the polyhouse was to be erected. The reason among about13 per cent polyhouses was quoted to be that they just followed others.

Table-5.9: Reasons for deviation from recommended design of polyhouse

(%, multiple responses)

Equipments installed	Categories			Overall
	Small	Medium	Large	
Financial constraints	72.92	20.69	6.82	33.34
Contractors' recommendations	24.52	18.59	2.50	15.77
Followed others	12.22	18.97	6.82	13.25

5.10 Cost of polyhouse construction

The average cost of polyhouse construction was found to be ₹385182 of which ₹ 208894 was the net cost paid by the farmers and the rest ₹ 184567 was subsidy amount (Table 5.10). The net cost paid by small farmers was ₹ 69855, ₹ 211180 in case of medium farmers and ₹ 357559 in case of large farmers.

Table-5.10: Cost of polyhouse construction

(₹)

Equipments installed	Categories			Overall
	Small	Medium	Large	
Total cost	126485	373680	682559	385182
Amount of subsidy	82500	162500	325000	184567
Net cost paid by farmers	69855	211180	357559	208894

5.11 Summing up

The analysis indicates that friends and relatives are the most important source of information about the polyhouses however, for authentic and detailed information vast majority resorts to department. The decision making process of the respondents was influenced by variety of motivational factors and hindrances they encountered during this stage. Majority of polyhouse construction was supervised by the authorities and they had supportive attitude towards the farmers. The farmers were vigilant and came out with variety of suggestion for improving the present scenario of polyhouse scheme in the State. Farmers had installed many types of equipment in polyhouses which are important for ensuring high productivity and quality of products. Sometimes the farmers deviated from the approved design mainly because of financial stringencies and such deviations were not significant.

Chapter – 6

COSTS AND RETURNS FROM PROTECTED CROPS

In this chapter an attempt has been made to calculate the various costs incurred on cultivation of crops under protected and unprotected conditions by different categories of sampled polyhouse farmers in Himachal Pradesh. It was found that the farmers were growing large variety of crops under protected and unprotected conditions. It was felt that it will not be possible to cover all such crops and also the area and efforts devoted to such crops made them quite unimportant. Hence, the present analysis has been carried out only for selected important crops. These crops included carnation, capsicum and tomato under protected conditions and wheat, maize, beans, cabbage, tomato etc under unprotected conditions. The unit for cost of cultivation for selected crops, under protected conditions, has been taken to be the average size of polyhouse. These sizes are 250 Sq. Meters for small, 500 Sq. Meters for medium and 1000 Sq. Meter for large category of farmers.

Cost of cultivation includes various operations and inputs. The labour used for different operation has been evaluated at current market wage rate prevailing in different villages. The home labour has also been evaluated at the same rate. The input costs have been taken to be actual cost of inputs and the costs of transportation, carriage, handling etc, if any, have been added to purchase price of inputs to work out the actual cost of inputs applied. Many of the inputs are home produced or some portion of these are home produced. Under such circumstances the home produced inputs have been evaluated at the current market price for working out the cost of cultivation of selected crops. The following text presents the details.

6.1 Cost of cultivation of carnation

The cost of cultivation, at overall level was found to be ₹ 126102 per polyhouse and this cost was ₹ 62079 for small, ₹ 104092 for medium and ₹ 202988 for large

polyhouse farmers (Table 6.1). It was found that value of sapling was the largest cost component accounting for 26 per cent of the total cost of cultivation. This is the average value for 5 years of life of plant. This was followed by application of FYM (15 %) and Vermicompost and fertilizer (11 % each), making the manures and fertilizers, considered together, the largest cost component. Insecticides/pesticides application was 5 per cent of total cost. The cost of harvesting of these flowers was 9 per cent of total cost. Other details of different categories can be seen from this table.

Table-6.1: Cost of cultivation of carnation under protected condition

(₹ /polyhouse)

Cost items	Category				
	Small	Medium	Large	Over all	
				₹	%
Formation of beds	1129	2596	4948	2979	2
Value of sapling	18667	25300	52666	32888	26
Sowing/ Transplanting	521	1130	2030	1262	1
Manuring/FYM	7909	16570	31480	19190	15
Vermicompost	6927	11940	20750	13520	11
Fertilizer	5065	9533	24939	13585	11
Insecticides/pesticides	3493	5511	9274	6223	5
Interculture	3305	7319	14394	8591	7
Irrigation	1646	2888	4406	3047	2
Spraying	3038	4018	7800	5048	4
Stalking etc.	3532	5050	6639	5151	4
Harvesting/ picking	5045	9025	17550	10815	9
Soil sterilization	1802	3212	6112	3804	3
Total production cost	62079	104092	202988	126102	100

6.2 Net returns from carnation cultivation

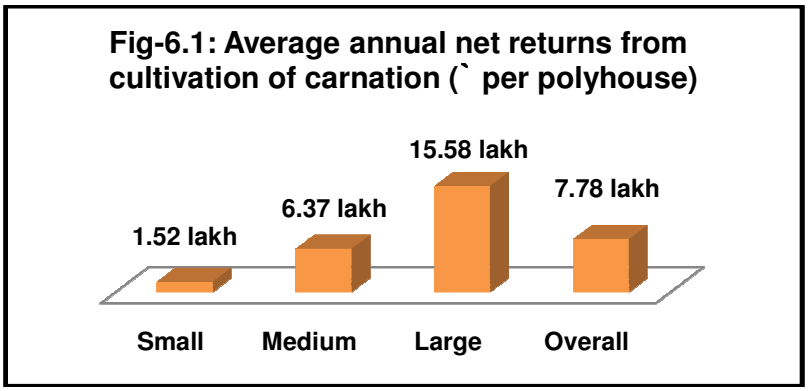
The net returns have been calculated by adding the marketing cost to the cost of production and then subtracting it from value of output. It was found that average net return from cultivation of carnation was ₹ 777732 per polyhouse at overall level,

(Table 6.2). However, the net returns were Rs, 151680 for small, ₹ 636968 for medium and ₹ 1558240 for large polyhouse farmers.

Table-6.2: Net returns from cultivation of carnation under protected condition

(₹ /polyhouse)

Cost items	Category			
	Small	Medium	Large	Over all
Production cost	62079	104092	202988	126102
Marketing cost	175851	515520	1125432	645021
Total cost	237930	619612	1328420	771123
Value of output	389610	1256580	2886660	1548855
Net returns	151680	636968	1558240	777732



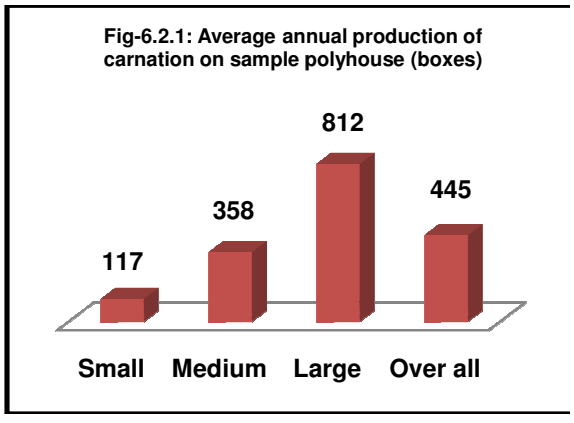
6.3 Net returns per box from carnation cultivation

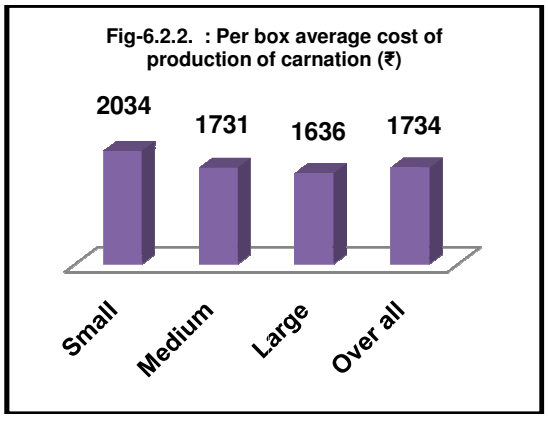
Net returns per box of carnation have been presented in Table 6.3 and it may be seen from the table that on an average total production was 445 boxes. This is average production based on five years of productive life of carnation plant. The production of spikes from each plant goes on increasing from 5-8 spikes per plant during first year to 40-50 spikes per plant during 5th year. The cost per box was ₹ 1734 and its value in market was ₹ 3484 resulting in net return of ₹ 1749 per box at aggregate level. The net returns per box were ₹ 1296 for small, ₹ 1779 for medium and ₹ 3555 for large polyhouse farmers. This scenario of costs and returns yielded an output-input ratio of 1:2.01 at overall level and 1:1.64 for small, 1:2.03 for medium and 1:2.17 for large polyhouse farmers.

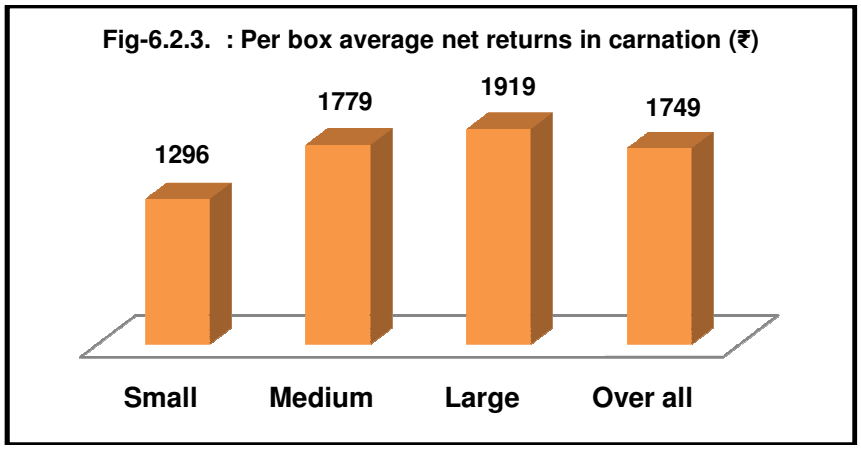
Table-6.3: Net returns per box and input-output ratio from cultivation of carnation under protected condition

(₹ /box of 900 spikes)

Cost items	Category			
	Small	Medium	Large	Over all
Total production (boxes)	117	358	812	445
Cost per box	2034	1731	1636	1734
Value per box	3330	3510	3555	3484
Returns per box	1296	1779	1919	1749
Output-input ratio	1:1.64	1:2.03	1:2.17	1:2.01







6.4 Cost of cultivation of capsicum

The cost of capsicum cultivation has been presented in Table 6.1. The cost of cultivation, at overall level was found to be ₹ 41477 per polyhouse and this cost was ₹ 16364 for small, ₹ 42105 for medium and ₹ 88563 for large polyhouse farmers. The analysis revealed that stalking of individual plants was the largest cost component accounting for 24 per cent of the total cost of cultivation. This was followed by application of FYM (18 %) and fertilizer (6 %). Insecticides/pesticides application was 5 per cent of total cost. Seeds/seedlings accounted for only 3 per cent of the total cost. The cost of bed formation and transplanting the sapling was higher than this and stood at 6 per cent each. The cost of harvesting the capsicum was 10 per cent of total cost. Other details of different categories can be seen from this table.

Table-6.4: Cost of cultivation of capsicum under protected condition

(₹ /polyhouse)

Cost items	Category				
	Small	Medium	Large	Over all	
				₹	%
Formation of beds	1080	2734	5454	2661	6
Seed/ seedlings	700	1200	2500	1238	3
Transplanting	1072	2360	5651	2449	6
Manuring/FYM	3480	8700	10487	7618	18
Vermicompost	0	0	0	0	0
Fertilizer	952	2671	4122	2423	6
Insecticides/pesticides	400	1945	5015	1943	5
Inter culture	864	2160	6237	2346	6
Irrigation	1161	3240	3456	2747	7
Spraying	216	540	1400	567	1
Stalking etc.	3428	9676	24656	9987	24
Harvesting/ picking	1296	3559	13635	4253	10
Soil sterilization	1715	3320	5950	3248	8
Total	16364	42105	88563	41477	100

6.5 Net returns from capsicum cultivation

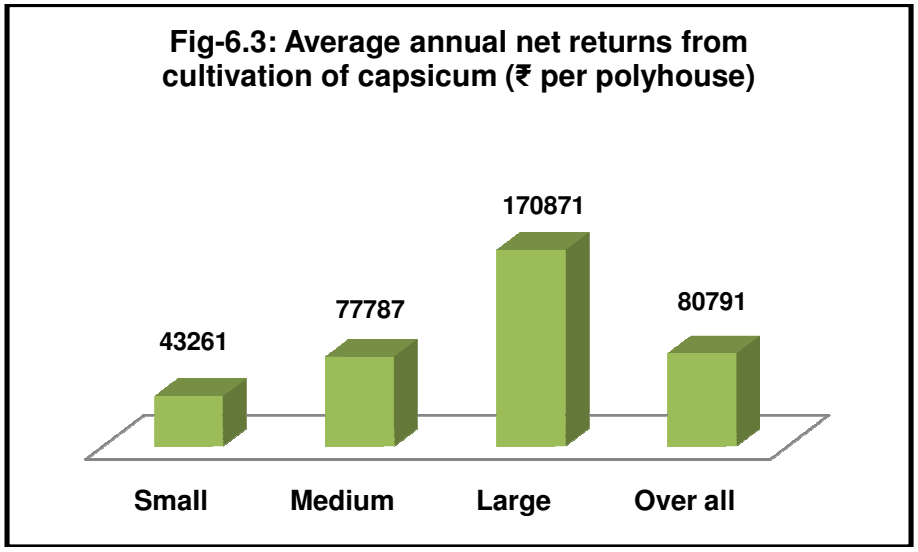
The net returns from capsicum cultivation have been presented in Table 6.5 and have been calculated by adding the marketing cost to the cost of production and then subtracting it from value of output. It was found that average net return from

cultivation of capsicum was ₹ 80791 per polyhouse at overall level. However, the net returns were ₹ 43261 for small, ₹ 77787 for medium and ₹ 170871 for large polyhouse farmers.

Table-6.5: Net returns from cultivation of capsicum under protected condition

(₹ /polyhouse)

Cost items	Category			
	Small	Medium	Large	Over all
Production cost	16364	42105	88563	41477
Marketing cost	11925	22248	44091	22398
Total cost	28289	64353	132654	63875
Value of output	71550	142140	303525	144666
Net returns	43261	77787	170871	80791



6.6 Net returns per box from capsicum cultivation

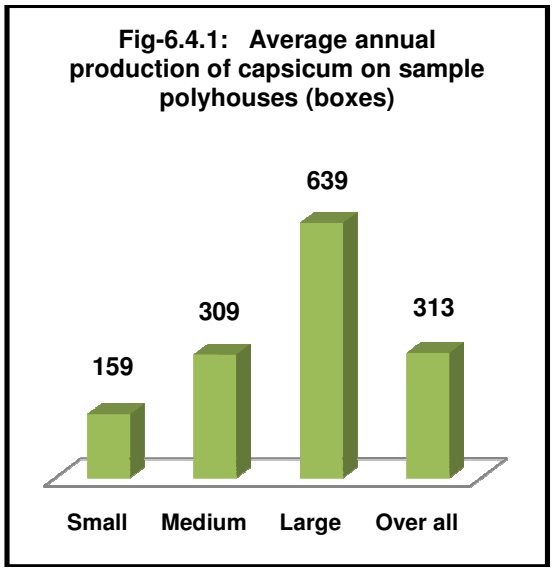
Net returns per box of capsicum have been presented in Table 6.6 and it is found from the table that on an average total production was 313 boxes. The cost per box was ₹ 204 and its value in market was ₹ 463 resulting in net return of ₹ 258 per box

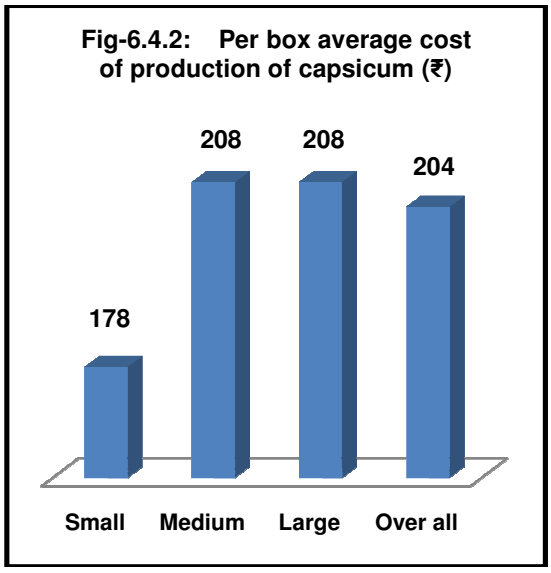
at aggregate level. The net returns per box were ₹ 272 for small, ₹ 252 for medium and ₹ 267 for large polyhouse farmers. This scenario of costs and returns yielded an output-input ratio of 1:2.26 at overall level and 1:2.53 for small, 1:2.21 for medium and 1:2.29 for large polyhouse farmers.

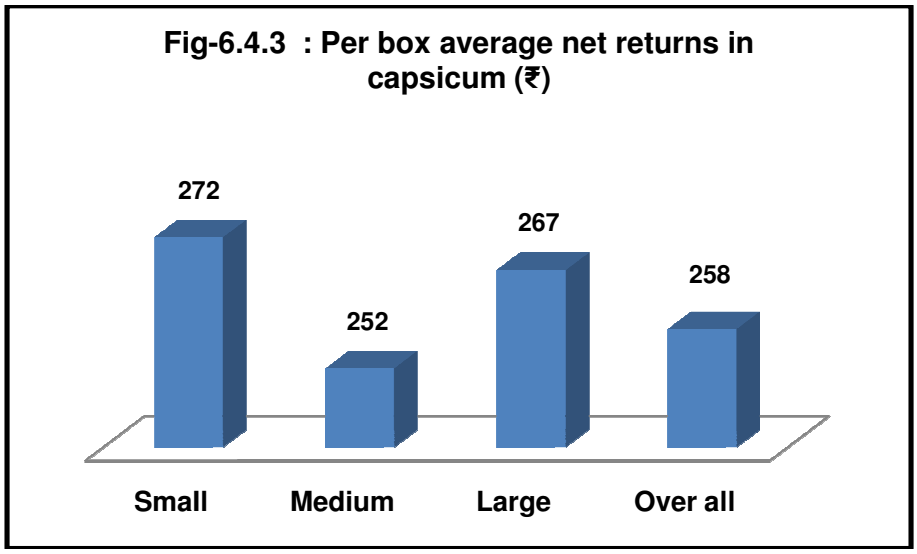
Table-6.6: Net returns per box and input-output ratio from cultivation of capsicum under protected condition

(₹ /box of 20 Kgs)

Cost items	Category			
	Small	Medium	Large	Over all
Total production (boxes)	159	309	639	313
Cost per box	178	208	208	204
Value per box	450	460	475	463
Returns per box	272	252	267	258
Output-input ratio	1:2.53	1:2.21	1:2.29	1:2.26







6.7 Cost of cultivation of tomato

The cost of cultivation for tomato has been presented in Table 6.7 wherein it may be seen that the cost of cultivation, at overall level was found to be ₹ 35255 per polyhouse and this cost was ₹ 19100 for small, ₹ 42386 for medium and ₹ 82265 for large polyhouse farmers. The analysis reveals that fertilizer application was the largest cost component accounting for 20 per cent of the total cost of cultivation. This was followed by stalking of individual plants (17 %) and Insecticides/pesticides (12 %). Manure/FYM application was 10 per cent of total cost. No farmer was observed to be using vermicompost in this crop. Seeds/seedlings accounted for only 4 per cent of the total cost. The cost of bed formation accounted for another 4 per cent and transplanting the sapling was higher than this and stood at 9 per cent. The cost of harvesting the tomato was 8 per cent of total cost and similar cost was incurred on soil sterilization. The costs incurred on interculture and irrigation stood at 4 per cent each. Other details of different categories can be seen from this table.

Table-6.7: Cost of cultivation of tomato under protected condition

(₹ /polyhouse)

Cost items	Small	Medium	Large	Over all	
				₹	%
Formation of beds	810	1871	3510	1533	4
Seed/ seedlings	780	1474	2650	1261	4
Sowing/ Transplanting	1542	3663	8240	3081	9
Manuring/FYM	1896	4410	6660	3493	10
Vermicompost	0	0	0	0	0
Fertilizer	4488	7580	17160	6939	20
Insecticides/pesticides	2383	5238	8000	4212	12
Inter culture	810	1620	3320	1394	4
Irrigation	810	1710	3210	1431	4
Spraying	70	540	1620	416	1
Stalking etc.	2845	7255	15375	5945	17
Harvesting/ picking	911	3645	6480	2676	8
Soil sterilization	1755	3380	6040	2874	8
Total production cost	19100	42386	82265	35255	100

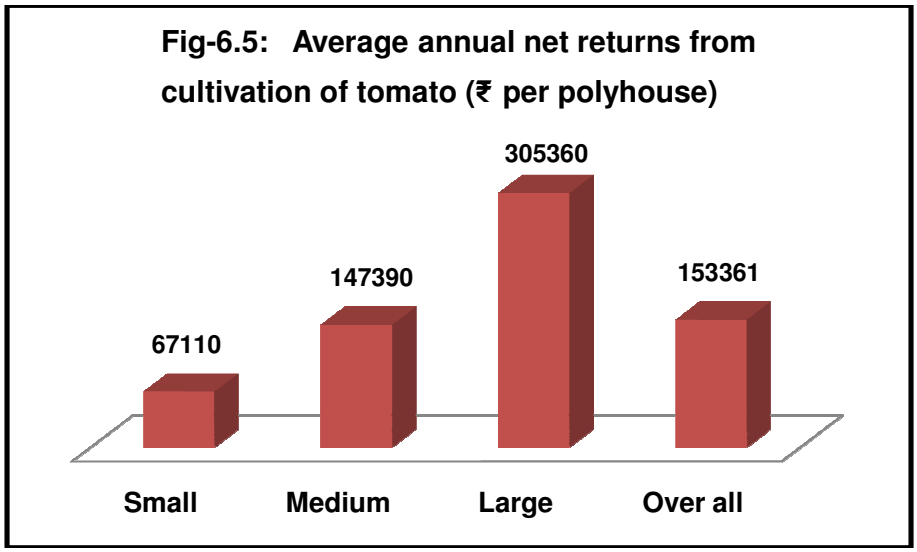
6.8 Net returns from tomato cultivation

The net returns from tomato cultivation for different size categories have been presented in table 6.8. The analysis reveals that total cost of tomato cultivation was ₹ 70738 per polyhouse at overall level which were ₹ 37740 for small, ₹ 78578 for medium and ₹ 147890 for large polyhouse farmers. It was found that average net return from cultivation of tomato was ₹ 153361 per polyhouse at overall level. However, the net returns were ₹ 67110 for small, ₹ 147390 for medium and ₹ 305360 for large polyhouse farmers.

Table-6.8: Net returns from cultivation of tomato under protected condition

(₹ /polyhouse)

Cost items	Category			
	Small	Medium	Large	Over all
Production cost	19100	42386	82265	35255
Marketing cost	18640	36192	65625	35483
Total cost	37740	78578	147890	70738
Value of output	104850	225968	453250	224099
Net returns	67110	147390	305360	153361



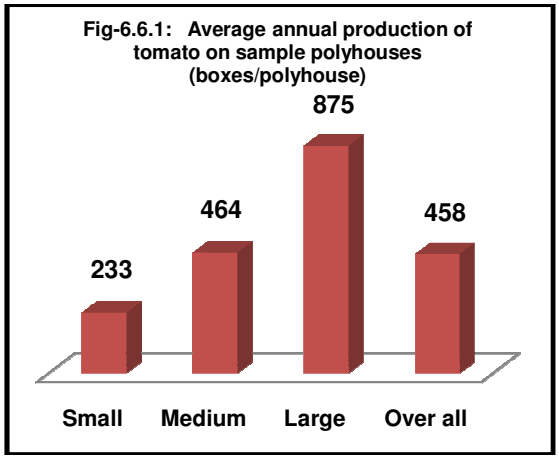
6.9 Net returns per box from tomato cultivation

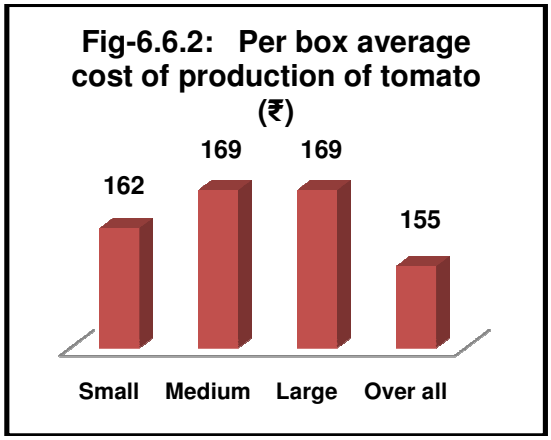
Net returns per box of tomato have been presented in Table 6.9 and it is found from the table that on an average total production was 458 boxes. The cost per box was ₹ 155 and its value in market was ₹ 490 resulting in net return of ₹ 335 per box at aggregate level. The net returns per box were ₹ 288 for small, ₹ 318 for medium and ₹ 349 for large polyhouse farmers. This scenario of costs and returns yielded an output-input ratio of 1:3.17 at overall level and 1:2.78 for small, 1:2.88 for medium and 1:3.06 for large polyhouse farmers.

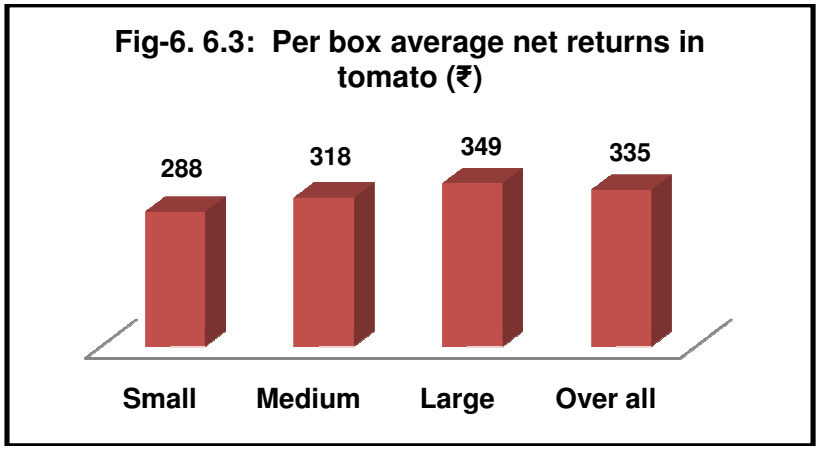
Table-6.9: Net returns per box and input-output ratio from cultivation of tomato under protected condition

(₹ /box of 25 Kgs)

Cost items	Category			
	Small	Medium	Large	Over all
Total production (boxes)	233	464	875	458
Cost per box	162	169	169	155
Value per box	450	487	518	490
Returns per box	288	318	349	335
Output-input ratio	1:2.78	1:2.88	1:3.06	1:3.17







6.10 Unprotected cultivation

Though this study concentrates mainly on the economics of protected cultivation, the main activities of farmers still revolve around the normal farming under unprotected conditions. It becomes, therefore, necessary to study the cropping pattern, production pattern and economics of crops grown in open farms. It is with this view the present analysis has been carried out.

6.10.1 Cropping pattern

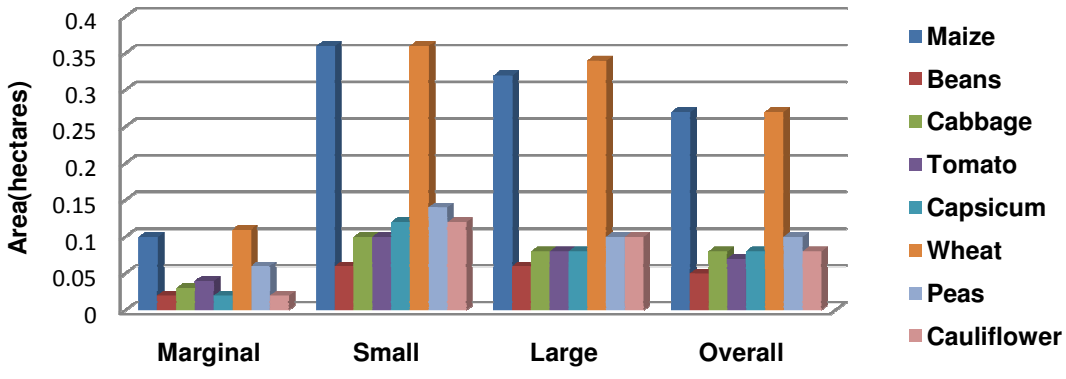
The cropping pattern of the sampled farmers has been presented in Table 6.10 covering different categories of farmers and important crops grown by them. The table indicates that major crops grown in Kharif season are maize, beans, cabbage, tomato and capsicum whereas in rabi season these are wheat, peas, cabbage and cauliflower. In Kharif season maize was the most important crop covering an area of 0.27 ha at overall level and in rabi season it was wheat having same amount of area under this crop. Capsicum and cauliflower were the next important crops in respective seasons. The analysis indicates a gross cropped area was one ha at overall level whereas this was 0.40 ha for small, 1.38 ha for medium and 1.16 ha for large category of farmers.

Table- 6.10: Cropping pattern on sampled farms

(Area in Ha/farm)

Crops	Category			Overall
	Marginal	Small	Large	
Kharif crops				
Maize	0.10	0.36	0.32	0.27
Beans	0.02	0.06	0.06	0.05
Cabbage	0.02	0.04	0.04	0.04
Tomato	0.04	0.10	0.08	0.07
Capsicum	0.02	0.12	0.08	0.08
Rabi crops				
Wheat	0.11	0.36	0.34	0.27
Peas	0.06	0.14	0.10	0.10
Cabbage	0.01	0.06	0.04	0.04
Cauliflower	0.02	0.12	0.10	0.08
GCA	0.40	1.38	1.16	1.00

Fig- 6.7: Cropping pattern on sample farms (ha/farm)



6.10.2 Cost of cultivation of unprotected crops

The cost of cultivation of important crops grown under unprotected condition has been presented separately for each size category separately in the following text.

6.10.2.1 Small farmers: The cost of cultivation of important crops grown by small farmers has been presented in Table 6.11 wherein it may be seen that the cost of cultivation for traditional crops viz wheat and maize is significantly lower than the vegetable crops. The cost of cultivation of wheat and maize were ₹ 20145 and ₹18027/ha, respectively. On the other hand, cost of cultivation of cauliflower, cabbage, peas and beans were ₹ 62619, ₹ 46351, ₹ 40683 and ₹ 29624 per hectare, respectively. The table depicts that there has been no expenditure on irrigation and hired machinery in any of the crops. The general trend is that the highest cost component in all the crops is manure followed by human labour. Hired animal labour is used in all crops except for maize and beans.

Table- 6.11: Cost of cultivation of unprotected crops grown on small farms

(₹ /Ha.)

Cost items	Crops					
	Wheat	**Maize**	**Cauliflower**	**Cabbage**	**Peas**	**Beans**
Seed	1991	1385	7448	5769	4219	3333
Manure	9119	6609	20651	16875	20313	13542
Fertilizer	1377	1258	6667	5673	1250	833
I&P	0	0	7292	5673	3789	1250
Irrigation	0	0	0	0	0	0
Hired machinery	0	0	0	0	0	0
Hired animal labour	232	0	313	481	313	0
Human labour	7425	8775	20250	11880	10800	10665
Total cost	20145	18027	62619	46351	40683	29624

6.10.2.2 Medium farmers: The cost of cultivation in case of medium farmers has been presented in Table 6.12 and it may be seen that the cost of cultivation for traditional crops viz wheat and maize were ₹ 20186 and ₹17455 respectively. On the other hand, cost of cultivation of cauliflower, cabbage, peas and beans were ₹ 48586, ₹ 35745, ₹ 30599 and ₹ 34541 per hectare, respectively. There is no cost involved on irrigation in any of the crops and negligible amount is spent on hired machinery in case of wheat and maize. Hired animal labour is used only for wheat, cauliflower and cabbage.

6.10.2.3 Large farmers: The cost of cultivation in case of large farmers presented in Table 6.13 reveals that the cost of cultivation for traditional crops viz wheat and maize were ₹ 19835 and ₹19000 per hectare, respectively. On the other hand, cost of cultivation of cauliflower, cabbage, peas and beans were ₹ 50066, ₹ 33029, ₹ 29355 and ₹ 33160 per hectare, respectively. The large farmers also did not spend any amount on irrigation for any of the crops. Hired machinery was used only for wheat and maize and hired animal labour was used only for wheat and cauliflower. The general trend of highest cost component being manure followed by human labour was also observed in this case also and for all the crops.

Table- 6.12: Cost of cultivation of Unprotected Crops Grown on medium farms

(₹ /Ha.)

Cost items	Crops					
	Wheat	**Maize**	**Cauliflower**	**Cabbage**	**Peas**	**Beans**
Seed	2116	1933	6557	6875	4417	5909
Manure	8975	5672	12620	7975	11870	7380
Fertilizer	1463	1525	4836	5000	1688	5852
I&P	0	0	6107	5455	2875	5000
Irrigation	0	0	0	0	0	0
Hired machinery	5	6	0	0	0	0
Hired animal labour	217	0	266	170	0	0
Human labour	7410	8320	18200	10270	9750	10400
Total	20186	17455	48586	35745	30599	34541

6.10.2.4 All farmers: The cost of cultivation in case of all farmers considered together has been presented in Table 6.14 and it may be seen that the cost of cultivation for traditional crops viz wheat and maize were ₹ 20070 and ₹ 18091, respectively. On the other hand, cost of cultivation of cauliflower, cabbage, peas and beans was ₹ 53511, ₹ 38342, ₹ 33461 and ₹ 32562 per hectare, respectively.

Table- 6.13: Cost of cultivation of Unprotected Crops Grown on large farms

(₹ /Ha.)

Cost items	Crops					
	Wheat	Maize	Cauliflower	Cabbage	Peas	Beans
Seed	2173	3215	7232	7083	5500	5625
Manure	9080	5978	11970	8150	9380	7550
Fertilizer	1649	1998	5179	5104	1875	5625
I&P	0	0	5179	2292	3500	5000
Irrigation	0	0	0	0	0	0
Hired machinery	8	9	0	0	0	0
Hired animal labour	35	0	357	0	0	0
Human labour	6890	7800	20150	10400	9100	9360
Total	19835	19000	50066	33029	29355	33160

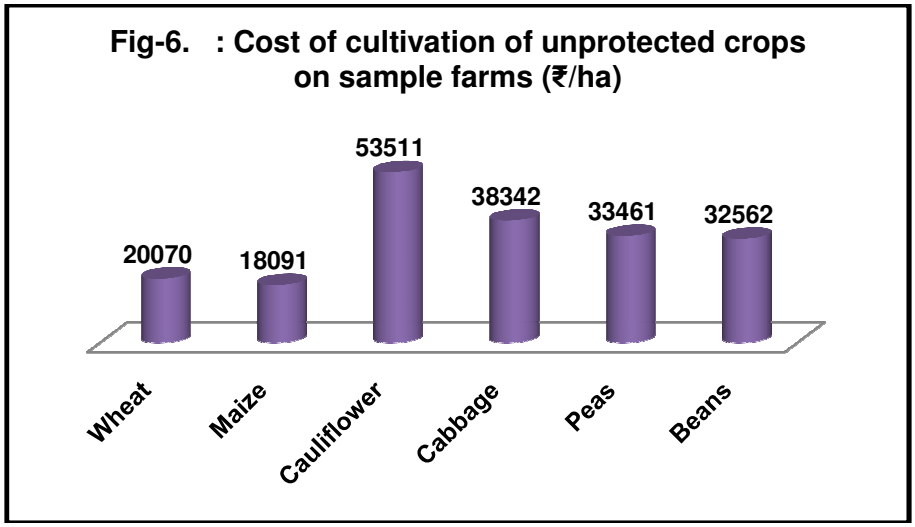


Table-6.14: Cost of cultivation of Unprotected Crops Grown on All farms

(₹ /Ha.)

Cost items	Crops					
	Wheat	Maize	Cauliflower	Cabbage	Peas	Beans
Seed	2093	2134	7040	6582	4671	5001
Manure	9052	6062	14999	10874	13841	9402
Fertilizer	1490	1578	5522	5246	1603	4179
I&P	0	0	6214	4597	3351	3800
Irrigation	0	0	0	0	0	0
Hired machinery	4	5	0	0	0	0
Hired animal labour	168	0	308	220	100	0
Human labour	7262	8313	19428	10823	9895	10180
Total	20070	18091	53511	38342	33461	32562

6.10.3 Productivity of crops

The productivity of crops grown under unprotected conditions has been presented in Table 6.15. There is mixed trend in productivity of crops across the farm categories. At overall level the level of crop productivity in case of Kharif crops was 22 Qtls/ha in case of maize, 84 Qtls/ha in case of beans, 149 Qtls/ha in case of cabbage, 231 Qtls/ha in case of tomato and 89 Qtls/ha in case of capsicum. In case of rabi crops the level of productivity was 20 Qtls/ha in case of wheat, 44 Qtls/ha in case of peas, 165 Qtls/ha in case of cabbage and 166 Qtls/ha in case of cauliflower.

Table- 6.15: Productivity of crops on sampled farms

(Quintals/Ha.)

Crops	Category			Overall
	Small	Medium	Large	
Kharif crops				
Maize	23	21	22	22
Beans	86	87	78	84
Cabbage	175	145	128	149
Tomato	225	222	247	231
Capsicum	94	78	95	89
Rabi crops				
Wheat	20	18	22	20
Peas	46	39	48	44
Cabbage	194	162	140	165
Cauliflower	191	194	114	166

6.10.4 Production of crops

The aggregate production of crops per farm grown under unprotected conditions has been presented in Table 6.16. Among the Kharif crops highest production per farm was that of tomato yielding a production of 16.19 qtls per farm at aggregate level. This was followed by capsicum and cabbage. The production of maize was about 6 qtls per farm. In case of rabi crops the level of production was 5.40 qtls/farm in case of wheat, 4.43 qtls/farm in case of peas, 6.61 qtls/farm in case of cabbage and 13.31 qtls/farm in case of cauliflower.

Table-6.16: Production of crops on sampled farms

(Quintals/farm)

Crops	Category			Overall
	Small	Medium	Large	
Kharif crops				
Maize	2.30	7.56	7.04	5.94
Beans	1.72	5.22	4.68	4.18
Cabbage	3.50	5.80	5.12	5.97
Tomato	9.00	22.20	19.76	16.19
Capsicum	1.88	9.36	7.60	7.12
Rabi crops				
Wheat	2.20	6.48	7.48	5.40
Peas	2.76	5.46	4.80	4.43
Cabbage	1.94	9.72	5.60	6.61
Cauliflower	3.82	23.28	11.40	13.31

6.10.5 Value of output

The value of crops grown under unprotected conditions has been presented in Table 6.17. Among the Kharif crops highest value per farm was that of tomato amounting to ₹ 24290 per farm at overall level. This was followed by capsicum and beans. The value of maize was ₹ 6831 per farm. In case of rabi crops the value of cauliflower was ₹ 21291 per farm followed by peas ₹ 7980, wheat ₹ 7560 and cabbage ₹ 5952 per farm.

Table- 6.17: Value of output from crops on sampled farms

(Value in ₹/farm)

Crops	Category			Overall
	Marginal	Small	Large	
Kharif crops				
Maize	2645	8694	8096	6831
Beans	4300	13050	11700	10458
Cabbage	3850	6380	5632	6571
Tomato	13500	33300	29640	24290
Capsicum	2820	14040	11400	10680
Rabi crops				
Wheat	3080	9072	10472	7560
Peas	4968	9828	8640	7980
Cabbage	1746	8748	5040	5952
Cauliflower	6112	37248	18240	21291

6.11 Summing up

The study of costs and returns from protected and unprotected cultivation indicates that the cost of carnation cultivation at overall level was ₹ 126102 per polyhouse and yielded a net return of ₹ 1749 per box with an input-output ratio of 1:2.01. Similarly, cost of capsicum cultivation at overall level was ₹ 41477 per polyhouse and yielded a net return of ₹ 258 per box with an input-output ratio of 1:2.26. The cost of tomato cultivation at overall level was ₹ 35255 per polyhouse and yielded a net return of ₹ 335 per box with an input-output ratio of 1:3.17. In addition to this the costs of cultivation of crops like wheat, maize, cauliflower, cabbage, peas and beans were worked out for comparison with the returns from crops grown under protected

conditions. The cost of cultivation of these crops were ₹ 20070 per ha for wheat, ₹ 18091 per ha for maize, ₹ 53511 per ha for cauliflower, ₹ 38342 per ha for cabbage, ₹ 33461 per ha for peas and ₹ 32562 per ha for beans. The productivity of these crops along with total per farm production and the value of production were also worked out. The returns from protected cultivation are significantly higher than that of unprotected crops.

Chapter – 7

MARKETING SYSTEM OF PROTECTED CROPS

The study of utilization pattern of protected crops is important aspect of planning for marketing. This aspect has been dealt in present chapter which also concentrates on marketing pattern, marketing costs and price spread etc.

7.1 Production and utilization of protected crops

The production and utilization pattern of carnation, capsicum and tomato in sampled area has been presented in Table 7.1. The analysis reveals that out of the total production of 447 boxes of carnation at overall level only 8 boxes were the losses at different stages. There was no family consumption and negligible amount was used as gifts or given as wages. In case of capsicum only 9 boxes out of total produce of 313 boxes were written off as losses, 0.08 boxes were consumed by the family and 0.13 boxes given as gifts to relatives etc, whereas negligible amount was given as wages. However, in tomato, the total production per farm was 394 boxes of which 10 boxes were reported to be as looses. Only 0.23 boxes were consumed by the farming family and 0.16 boxes given as gifts and negligible amount was given as wages.

Table-7.1: Production and utilization of protected crops on sampled farms

(Boxes per year)

Category	Production	Retained (% of total production)			
		Losses	Family	Gifts	Wages
Carnation (Box of 900 spikes)					
Small	117	8	0	Neg.	Neg.
Medium	358	6	0	Neg.	Neg.
Large	812	9	0	Neg.	Neg.
Overall	447	8	0	Neg.	Neg.
Capsicum (Box of 20 Kgs.)					
Small	159	7	0.12	0.21	Neg.
Medium	309	9	0.07	0.11	Neg.
Large	639	10	0.03	0.07	Neg.
Overall	313	9	0.08	0.13	Neg.
Tomato (Box of 25 Kgs.)					
Small	233	9	0.26	0.20	Neg.
Medium	464	11	0.21	0.13	Neg.
Large	875	12	0.15	0.08	Neg.
Overall	394	10	0.23	0.16	Neg.

7.2: Marketing pattern of protected crops

The flowers and vegetables produced under protected conditions are marketed at three places. The main destination for the produce is Delhi market, followed by markets of neighbouring States and lastly the local markets, Table 7.2 presents the details. The analysis reveals that at overall level out of the total marketed surplus of 445 boxes of carnation, 435 boxes were marketed in Delhi market. The quantity sold

in markets of neighbouring States and local markets was six and three boxes, respectively. In case of capsicum, 290 boxes out of total marketed produce of 313 boxes were marketed in Delhi market, 16 boxes were marketed in neighbouring States and only seven in local markets. However, in tomato, the total marketed quantity per farm was 473 boxes of which 365 boxes were marketed in Delhi market, 21 boxes were marketed in neighbouring States and only nine in local markets.

The scenario of prices received in different markets has also been presented in this table. There was clear cut trend of prices being highest in Delhi market followed by markets of neighbouring States and lastly the local markets with lowest prices. But the marketing in local markets had an advantage of lower marketing cost, compensating the lower prices. The details can be seen from the table.

Table- 7.2: Marketing pattern of protected crops on sampled farms

(Qty. in boxes, rate in ₹)

Category	Sold at							
	Delhi market		Neighbouring States		Local markets		Total	
	Qty	Rate/box	Qty	Rate/box	Qty	Rate/box	Qty	Rate/box
Carnation								
Small	107	3337	8	3315	2	2980	117	3330
Medium	340	3540	10	3310	8	2800	358	3510
Large	812	3555	0	0	0	0	812	3555
Overall	435	2584	6	2153	3	1874	445	3472
Capsicum								
Small	145	460	10	355	4	310	159	450
Medium	286	469	15	360	8	310	309	460
Large	596	484	33	365	10	332	639	475
Overall	290	469	16	359	7	313	313	459
Tomato								
Small	202	470	20	340	11	295	233	450
Medium	442	492	16	395	6	320	464	487
Large	805	522	61	444	14	398	875	518
Overall	365	485	21	375	9	315	394	473

7.3: Marketing costs and price spread of carnation in Delhi market

The marketing costs incurred by producer and intermediaries for marketing carnation in Delhi, have been presented in Table 7.3. On an average, marketing cost per 100 spikes, incurred by producers was ₹ 160 which was 17.60 per cent of the consumers' price of ₹ 909 per 100 spikes. The breakup of marketing costs incurred by the carnation producer reveals that commission of commission agent and transportation (including carriage up to road head/ISBT and then to market) constituted major share in total cost of producers. Commission for forwarding agent was ₹75 per 100 spikes. Wholesale price of 100 spikes of carnation was ₹ 500 in Delhi. Market fee was charged @ 1%. Adding to this the other costs of spoilage, telephone charges etc and margin of commission agent the mashakhore's purchase price was found to be ₹ 590 per 100 spikes which was about 65 per cent of consumers' price. The expenses paid by mashakhore were ₹ 12 and his margin of profit was found to be ₹ 89, about 10 % of consumers' price. This way the retailers' purchase price was calculated to be ₹ 691 per 100 spikes. Total expenses paid by retailer were ₹ 80 and his margin was ₹ 138 per 100 spikes.

Table- 7.3: Marketing costs and price spread of 100 spikes of carnation in Delhi market

(₹/100 spikes)

Particulars	Cost	Per cent
Net price received by grower	340	37.40
Growers expenses on		
(a). Assembling charges up to store	0.50	0.05
(b). Grading& Packing	1.20	0.13
(c). Packing material	10	1.0
(d.)Transportation		
(i.) up to road head/I.S.B.T.	61	6.71
(ii).I.S.B.T .to market	10	1.10
(iii). Misc. charges	20	0.22
(e). Commission of C.A.@15%	75	8.25
Total expenses paid by the grower	160	17.00
Wholesale/ Gross price at market	500	55.00
(a).Market fee @ 1%	5	0.55
(b).Other cost (spoilage, telephone charges etc.)@ 2%	10	1.10
(c).Margin/Commission of C.A.@15%	75	8.25
Mashakhors' purchase price	590	64.91
Expenses borne by Mashakhor @ 2%	12	1.32
Margin of Mashakhor@15%	89	9.79
Retailers' purchased. price	691	76.00
Expenses borne by the retailer		
(a). Carriage up to retail shop	10	1.10
(b). Losses @10%	70	7.70
Total expenses paid by retailer	80	8.80
Retailers' Margin @20%	138	15.18
Consumer price	909	100.00

7.4 Marketing costs and margins of intermediaries in carnation marketing

The analysis of marketing costs and margins by various intermediaries in marketing of carnation indicates that the gross price received by the growers was ₹ 500 per 100 spikes which was about 55 per cent of the price paid by consumers. The costs paid by farmers, wholesalers, mashakhores and retailers were 17.60, 1.65, 1.32 and 8.80 per cent, respectively. This way total marketing cost of intermediaries was found to be ₹ 107, 11.74 per cent of the consumer price. The total marketing margin was ₹ 302 which was about 33 per cent of the consumer price.

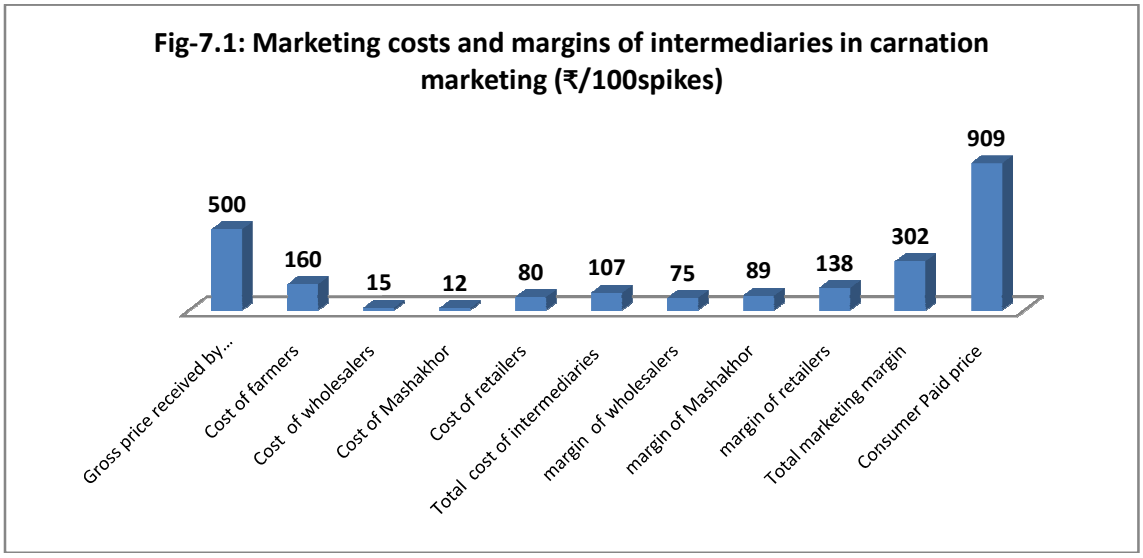


Table-7.4: Marketing costs and margins of intermediaries in carnation marketing.

(₹ per 100 spikes)

Particulars	Costs	Percentage
Gross price received by growers	500	55.00
Cost of farmers	160	17.60
Cost of wholesalers	15	1.65
Cost of Mashakhor	12	1.32
Cost of retailers	80	8.80
Total marketing cost of intermediaries	107	11.77
margin of wholesalers	75	8.25
margin of Mashakhor	89	9.80
margin of retailers	138	15.18
Total marketing margin	302	33.22
Consumer Paid price	909	100.00

7.5 Mode (packing) of carnation retail sale

There are different packing in which the flowers are sold in the retail market in Delhi (Table 7.5). The most common mode is sale of spikes in loose form and on an average retailer sells about 3000 spikes per day with average purchase price of ₹ 7.54 per spike and sale price of ₹ 9.9 per spike. Individuals are the consumers of this form of sale. Retailers also sell 30 bunches of 10 flowers each to individuals at the rate of ₹ 139 per bunch and on an average 12 bouquet at the rate of ₹ 300 per bouquet. Other forms of sale are car decorations for marriage etc and decorations of marriage homes; table provides details of material and labour costs involved.

Table-7.5: Average quantity of carnation sold in different packing

Flowers/ mode of packing	Av. Qty. /day	Av. Purchase Price	Av. Sale price	Material cost	Labour cost	Net profit	Major buyers
Spikes (per day)	3000	7.54	9.90	-	-	2.36	Individuals
Bunch of 10 spikes (per day)	30	75.40	139.00	10	30	63.60	Individuals
Buckeye of 10 spikes (per day)	12	75.40	300	30	50	144.60	Hoteliers
Car decorations (per year)	25	754	1100	10	100	236	Individuals
Decoration of marriage homes (per year)	25	2262	5500	50	200	2988	Individuals

7.6: Marketing costs and price spread of capsicum and tomato in Delhi

The marketing costs incurred by producer and intermediaries for marketing capsicum and tomato in Delhi, have been presented in Table 7.6 and the percentages of these costs etc have been presented in Table 7.7, the following text presents details.

7.6.1 Capsicum

On an average, marketing cost per quintal, incurred by producers was ₹ 310 which was about 10 per cent of the consumers' price of ₹ 3093 per quintal. The breakup of marketing costs incurred by the capsicum producer reveals that commission of commission agent and transportation constituted major share in total cost of producers. Commission for commission agent was ₹ 92 per quintal. Wholesale price

per quintal of capsicum was ₹ 2345 in Delhi. Adding to this the other costs of spoilage, telephone charges etc and margin of commission agent the mashakhore's purchase price was found to be ₹ 2604 per quintal which was about 84 per cent of consumers' price. The expenses paid by mashakhore were ₹ 21 and his margin of profit was found to be ₹ 28. This way the retailers' purchase price was calculated to be ₹ 2653 per quintal. Total expenses paid by retailer were ₹ 170 and his margin was ₹ 270 per quintal.

7.6.2 Tomato

On an average, marketing cost per quintal, incurred by producers was ₹ 358 which was 13.52 per cent of the consumers' price of ₹ 3093 per quintal. Commission for commission agent was ₹ 97 per quintal. Wholesale price of tomato was ₹ 1940 per quintal in Delhi. The mashakhore's purchase price was found to be ₹ 2174 per quintal which was about 82 per cent of consumers' price. The expenses paid by mashakhore were ₹ 20 and his margin of profit was found to be ₹ 25. This way the retailers' purchase price was ₹ 2219 per quintal. Total expenses paid by retailer were ₹ 181 and his margin was ₹ 248 per quintal.

7.7 Producers' share in consumer price

The net price received by producer in marketing of carnation was ₹ 227 per 100 spikes which is about 23 per cent of consumer price in Delhi market. In case of capsicum, net price received by producer was ₹ 2036 per quintal. The producers' share in consumer price was about 66 per cent. The net price received by tomato producers was ₹ 1582 per quintal which is about 60 per cent of consumer price in Delhi market.

Fig-7.2: Producser's share in consumer's rupee in marketing of protected crops on sample farms (% of consumers' price)

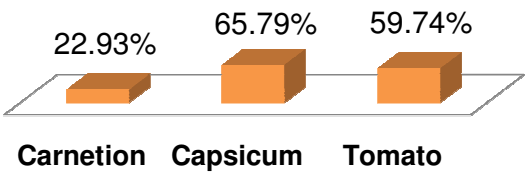


Table-7.6: Marketing costs and price spread of capsicum & tomato in Delhi

(₹/Quintal)

Particulars	Cost	
	Capsicum	Tomato
Net price received by grower	2035	1582
Growers' expenses on		
Picking, packing, grading and assembling	52	75
Packing material	6	5
Transportation		
(i.) Carriage up to road head	6	18
(ii).Freight up to market	143	144
(iii). Loading/unloading charges	7	10
Commission of C.A. and market fee	92	97
Other charges	4	9
Total expenses paid by the grower	310	358
Wholesale/ Gross price at market	2345	1940
Expenses of wholesaler/CA		
Handling charges	45	50
Margin/Commission	214	184
Sub-total	259	234
Mashakhors' purchase price	2604	2174
Expenses borne by Mashakhor	21	20
Margin of Mashakhor	28	25
Retailers' purchased. price	2653	2219
Expenses born by retailer		
Carriage up to retail shop	20	21
Losses	150	160
Total expenses paid by retailer	170	181
Retailers' Margin	270	248
Consumer price	3093	2648

Table- 7.7: Marketing costs and price spread of Capsicum & tomato in Delhi

(%)

Particulars	Capsicum	Tomato
Net price received by grower	65.79	59.74
Growers expenses on		
Picking, packing, grading and assembling	1.68	2.83
Packing material	0.19	0.19
Transportation		
(i.) Carriage up to road head	0.19	0.68
(ii).Freight up to market	4.62	5.44
(iii). Loading/unloading charges	0.23	0.38
Commission of C.A. and market fee	2.97	3.66
Other charges	0.13	0.34
Total expenses paid by the grower	10.02	13.52
Wholesale/ Gross price at market	75.82	73.26
Expenses of wholesaler/CA		
Handling charges	1.45	1.89
Margin/Commission	6.92	6.95
Sub-total	8.37	8.84
Mashakhors' purchase price	84.19	82.10
Expenses borne by Mashakhor	0.68	0.76
Margin of Mashakhor	0.91	0.94
Retailers' purchased. price	85.77	83.80
Expenses borne by the retailer		
Carriage up to retail shop	0.65	0.79
Losses	4.85	6.04
Total expenses paid by retailer	5.50	6.84
Retailers' Margin	8.73	9.37
Consumer price	100.00	100.00

7.8 Marketing costs and margins of intermediaries in capsicum and tomato marketing

The analysis of marketing costs and margins by various intermediaries in marketing of capsicum and tomato have been presented in Table 7.8 and respective percentages have been presented in Table 7.9. The results indicate that the gross price received by the growers was ₹ 2345 and ₹ 1940 per quintal of capsicum and tomato, respectively. These were about 76 and 73 per cent respectively of the prices paid by consumers. The costs paid by farmers, wholesalers, mashakhores and retailers were 10.02, 1.45, 0.68 and 5.50 per cent, respectively in case of capsicum. In case of tomato the respective costs were 13.52, 1.89, 0.76 and 6.84

per cent. This way total marketing cost of intermediaries was found to be ₹ 546 about 18 per cent of the consumer price in case of capsicum whereas total marketing cost of intermediaries was ₹ 609 about 23 per cent of the consumer price in case of tomato. The total marketing margin was ₹ 512 in case of capsicum and ₹ 457 in case of tomato and these were 16.55 and 17.26 per cent of the consumer price for capsicum and tomato respectively..

Table- 7.8: Marketing costs and margin of intermediaries in capsicum and tomato at Delhi

(₹/Quintal)

Particulars	Capsicum	Tomato
Gross price received by growers	2345	1940
Cost of farmers	310	358
Cost of wholesalers	45	50
Cost of Mashakhor	21	20
Cost of retailers	170	181
Total marketing cost of intermediaries	546	609
margin of wholesalers	214	184
margin of Mashakhor	28	25
margin of retailers	270	248
Total marketing margin	512	457
Consumer Paid price	3093	2648

Fig- 7.3: Marketing costs and margins of intermediaries in capsicum marketing (₹/quintal)

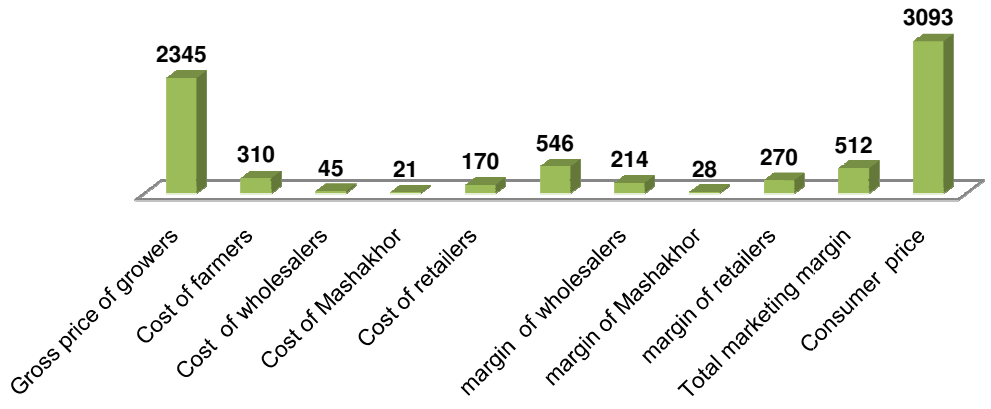


Fig-7.4: Marketing costs and margins of intermediaries in tomato marketing (₹/quintal)

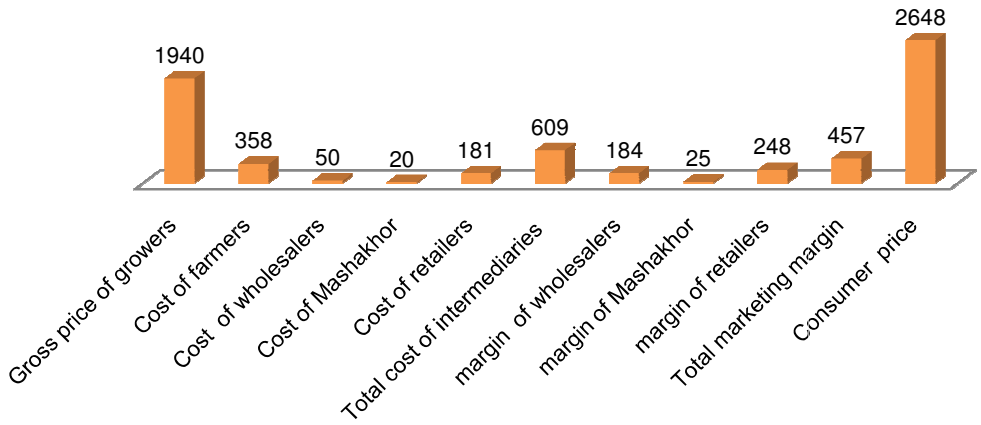


Table- 7.9: Marketing costs and margin of intermediaries in capsicum and tomato at Delhi

(%)

Particulars	Capsicum	Tomato
Gross price received by growers	75.82	73.26
Cost of farmers	10.02	13.52
Cost of wholesalers	1.45	1.89
Cost of Mashakhor	0.68	0.76
Cost of retailers	5.50	6.84
Total marketing cost of intermediaries	17.65	23.00
margin of wholesalers	6.92	6.95
margin of Mashakhor	0.91	0.94
margin of retailers	8.73	9.37
Total marketing margin	16.55	17.26
Consumer Paid price	100.00	100.00

7.9 Production losses

The production losses have been divided into two parts; pre harvest losses and post harvest losses. Detailed breakup of losses at post harvest stage has been further segregated into losses at picking, assembling, grading & packing and transportation

stages. These losses have been presented separately for different categories of farmers and for aggregate sample as well.

7.9.1 Small farms

On small farms the pre harvest losses were of the tune of 0.56, 0.69 and 0.92 per cent for carnation, capsicum and tomato, respectively (Table 7.10). The highest losses in post harvest stage were during transportation followed by grading and packing.

Table-7.10: Production losses at various stages on sample small farms

Crops	Pre harvest losses%	Post harvest losses %			
		Picking	Assembling	Grading & Packing	Transportation
Carnation	0.56	0.02	0.02	0.08	1.27
Capsicum	0.69	0.38	0.38	0.46	0.38
Tomato	0.92	0.77	0.85	0.85	0.85

7.9.2 Medium farms

On medium farms the pre harvest losses were of the tune of 2.20, 1.13 and 0.73 per cent for carnation, capsicum and tomato, respectively. These losses were significantly higher than small farms in respect of carnation and capsicum. Generally, the losses were higher for medium farmers as compared with small category. In this category also, the highest losses in post harvest stage were during transportation followed by grading and packing. Further details have been presented in Table 7.11.

Table-7.11: Production losses at various stages on sample medium farms

Crops	Pre harvest losses%	Post harvest losses %			
		Picking	Assembling	Grading & Packing	Transportation
Carnation	2.20	0.40	0.34	0.62	2.33
Capsicum	1.13	0.57	0.47	0.53	1.07
Tomato	0.73	0.37	0.37	0.47	0.70

7.9.3 Large farms

On large farms, the pre harvest losses were 1.73, 1.00 and 0.71 per cent for carnation, capsicum and tomato, respectively. These losses were significantly higher for transportation in respect of carnation, 4.82 per cent. Further details have been presented in Table 7.12.

Table- 7.12: Production losses at various stages on sample large farms

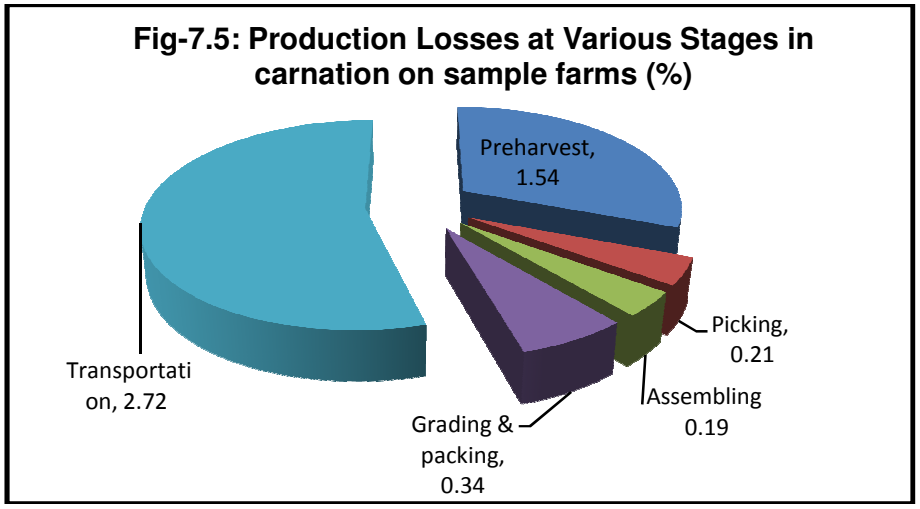
Crops	Pre harvest losses%	Post harvest losses %			
		Picking	Assembling	Grading & Packing	Transportation
Carnation	1.73	0.16	0.16	0.25	4.82
Capsicum	1.00	0.43	0.29	0.43	0.57
Tomato	0.71	0.29	0.14	0.14	0.29

7.9.4 All farms

The details of production losses for overall sample have been presented in Table 7.13. The pre harvest losses were of the tune of 1.54, 1.00 and 0.78 per cent for carnation, capsicum and tomato, respectively. These losses were significantly higher during transportation stage followed by grading & packing. The transportation losses were estimated to be 2.72, 0.82 and 0.68 per cent for carnation, capsicum and tomato, respectively.

Table-7.13: Production losses at various stages on all farms

Crops	Pre harvest losses%	Post harvest losses %			
		Picking	Assembling	Grading & Packing	Transportation
Carnation	1.54	0.21	0.19	0.34	2.72
Capsicum	1.00	0.50	0.42	0.50	0.82
Tomato	0.78	0.46	0.46	0.52	0.68



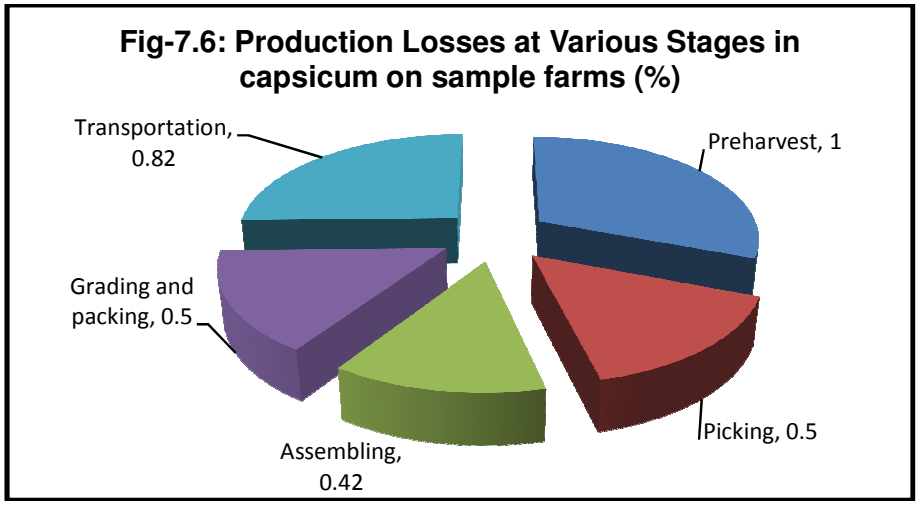
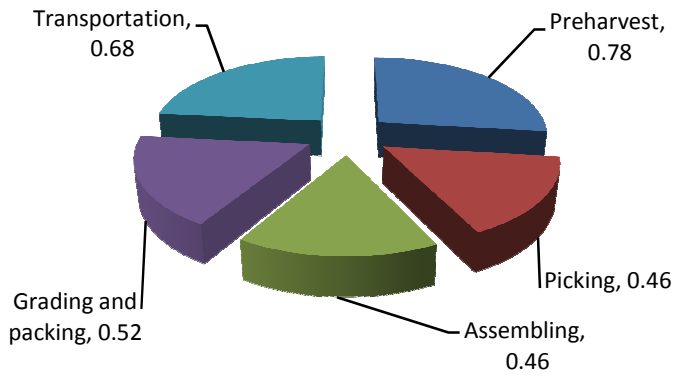


Fig-7.7: Production Losses at Various Stages in tomato on sample farms (%)



7.10 Summing up

The crops viz carnation, capsicum and tomato grown under the protected environment are the commercial crops and as such majority of produce is marketed mainly in Delhi followed by markets of neighbouring States and local markets. This pattern has emerged due to price scenarios which are highest in Delhi market for all the three crops. Small fraction of total vegetables produced is retained for home consumption. As the Delhi market is most important from price and quantity marketed points of view, marketing costs and margins etc have been worked out for this market only. It was found that in carnation the price paid by consumer for 100 spikes was ₹ 909 and net price received by producers was 37.40 per cent of this. These figures for capsicum were ₹ 3093 per quintal and 65.79 per cent and for tomato ₹ 2648 per quintal and 59.74 per cent, respectively. Total marketing cost for carnation was ₹ 107 and marketing margins were ₹ 302 per 100 spikes. The marketing costs for capsicum and tomato were ₹ 506 and ₹ 609, respectively and margins were ₹ 512 and ₹ 457, respectively. The analysis for quantifying the production losses was also carried out for all the size categories of farmers. The pre harvest losses at overall level were of the tune of 1.54, 1.00 and 0.78 per cent for carnation, capsicum and tomato, respectively.

Chapter – 8

PROBLEMS IN CULTIVATION OF PROTECTED CROPS

The activity of polyhouses has been increasing over the time in the State. But the farmers are facing many problems with regard to construction, inputs, cropping practices and harvesting of protected crops. Keeping all these factors in view, major problems of polyhouse farmers of Himachal Pradesh are discussed in the present chapter. Majority of farmers faced more than one problem in all the aspects and hence, analysis of multiple responses has been used for the purpose.

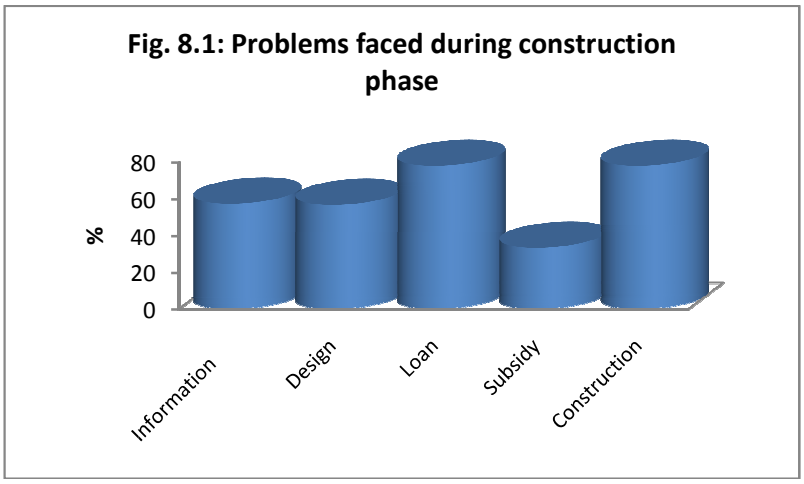
8.1 Problems faced during construction of polyhouses

The problems in this aspect related to information, design, loans etc, Table 8.1 provides the details. The analysis indicated that loan and problems during construction like delays or use of inferior materials were most important problems being faced by 78 per cent of the respondents. This was followed by problems in obtaining information about the time and cost schedules etc of polyhouse construction, about 57 per cent farmers confirmed to the problem at overall level. About similar percentage of farmers reveal that somehow they were not very happy with the design of polyhouse, though they had almost no idea about the technical specifications. About 33 per cent farmers revealed that they faced some problems in obtaining the subsidy.

Table- 8.1: Responses regarding problems faced during construction of polyhouses

(%, multiple responses)

Type of problem	Category			Overall
	Marginal	Small	Large	
Information	56.25	72.41	38.64	57.33
Design	52.08	70.69	43.18	56.67
Loan	75.00	87.93	68.18	78.00
Subsidy	27.08	51.72	15.91	33.33
Construction	68.75	89.66	72.73	78.00



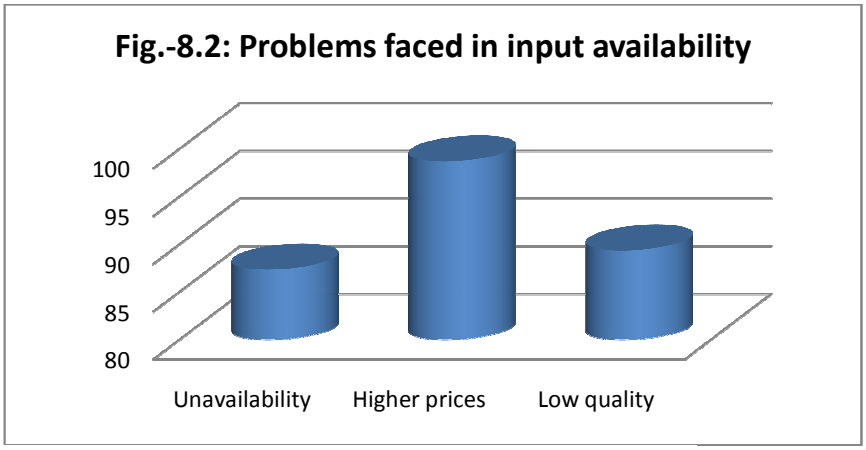
8.2 Problems faced in input availability

The analysis indicates that majority of farmers faced problems of unavailability, higher prices and low quality of specific inputs required for crop production in polyhouses. The percentage of farmers confirming to these problems were 87.33, 98.67 and 89.33, respectively at overall level (Table 8.2).

Table- 8.2: Responses regarding problems faced in inputs availability

(%, multiple responses)

Type of problem	Category			Overall
	Marginal	Small	Large	
Unavailability	77.08	96.55	86.36	87.33
Higher prices	100.00	100.00	95.45	98.67
Low quality	85.42	93.10	88.64	89.33



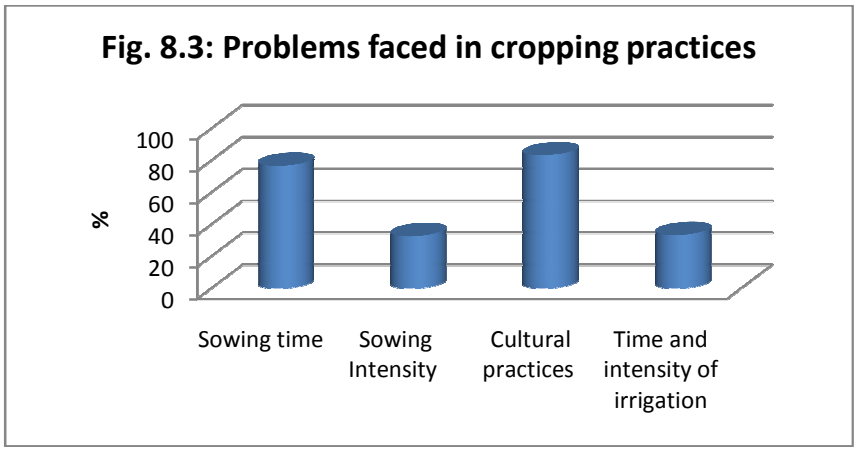
8.3 Problems faced in cropping practices

The cropping practices of crop production are significantly different than followed under unprotected conditions. Majority of farmers had little knowledge about sowing time and intensity etc, especially during the initial period. The main problem was the cultural practices; about 83 per cent had little information about these (Table 8.3). Sowing time was another major problem and about 77 per cent farmers revealed that they had little idea so as to what is the most appropriate sowing time. Sowing intensity was another area of concern.

Table- 8.3: Responses regarding problems faced in cropping practices

(%, multiple responses)

Type of problem	Category			Overall
	Marginal	Small	Large	
Sowing time	83.33	91.38	50.00	76.67
Sowing Intensity	25.00	51.72	15.91	32.67
Cultural practices	72.92	87.93	88.64	83.33
Time and intensity of irrigation	27.08	51.72	15.91	33.33



8.4 Problems faced in harvesting

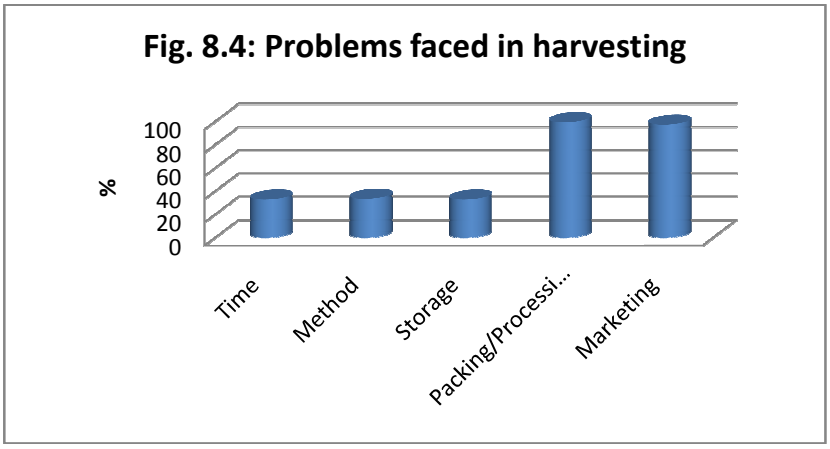
In the harvesting of crops grown in polyhouses the major areas of concerns were time and method of harvesting along with storage and marketing etc, table 8.4 presents details. It was found that almost all the respondents faced problems in packing and storage of polyhouse produce which was followed by marketing

problems, being faced by about 97 per cent farmers. About one third of respondents each faced problems in deciding about the time and method of harvesting and storage of the produce.

Table- 8.4: Responses regarding problems faced in harvesting

(%, multiple responses)

Type of problem	Category			Overall
	Marginal	Small	Large	
Time	27.08	50.00	15.91	32.67
Method	27.08	51.72	15.91	33.33
Storage	25.00	51.72	15.91	32.67
Packing/Processing	100.00	100.00	97.73	99.33
Marketing	93.75	98.28	100.00	97.33



8.5 Perception of farmers on protected cultivation

The present section of the study pertains to perceptions of polyhouse farmers regarding the benefits of protected cultivation, the results of analysis have been presented in Table 8.5. The analysis indicates that about 88 per cent of respondents were of the view that protected cultivation has helped to increase the production of flowers and vegetables. This was particularly true for farms located in cold regions. The percentage of farmers responding positively to this was almost equal in all the size categories. About 76 per cent farmers felt that polyhouse have been able to increase the employment opportunities in the village and hence should be further encouraged. At overall level about 81 per cent farmers felt that this has been instrumental in increasing the incomes of farmer families. The responses in this

regard were directly correlated with the size of polyhouses. About 45 per cent farmers also felt that protected cultivation has been able to facilitate the adoption of organic farming in the area.

Table- 8.5: Perception of farmers on protected cultivation

Particulars	Category			Overall
	Marginal	Small	Large	
Protected cultivation has helped to increase production	89.58	87.93	86.36	88.00
Protected cultivation has increased employment opportunities	72.92	79.31	75.00	76.00
Income has grown up after protected cultivation of crops	68.75	86.21	88.64	81.33
Protected cultivation facilitated adoption of organic farming	41.67	44.83	47.73	44.67

8.6 Summing up

Although the farmers responded positively to income and employment issues related with polyhouse farming, the activity is not free from problems. The polyhouse farmers face many problems in relation to construction of polyhouses, input availability, cropping practices and harvesting. Most important problems being faced by almost all the farmers were about packing/processing and marketing of produce.