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ORIGINAL ARTICLE

Status and Constraints in Vegetable Cultivation Under Polyhouse in Haryana

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ABSTRACT
In the present study, an attempt has been made to study the status and constraint in vegetable cultivation under polyhouse in Haryana. Karnal district was selected purposively based on predominance of vegetable cultivation under polyhouse. The primary data were collected by personal interviews of the selected farmers with the help of a specially designed schedule. Simple statistical tools like averages and percentages were used to compare, contrast and interpret the results properly. The overall findings of the study reveal that maximum number of polyhouse technology was adopted in Karnal (220) followed by Rohtak (185) while minimum number of polyhouses found in district Mahendergarh (10) in Haryana. The result of this study also revealed that short life of polysheet (92.5%) and infestation of insect-pest (90%) were found high in case of production constraints whereas lack of minimum support price (92.5%), high price fluctuation (87.5%) and lack of market information (75%) were major constraint in case of marketing constraints.
Key words: *Constraint, Polyhouse, Status, Vegetables cultivation.*

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INTRODUCTION

Vegetables are important constituents of Indian agriculture and nutritional security due to their short duration, high yield, nutritional richness, economic viability and ability to generate on-farm and off-farm employment. Vegetables are useful in rotational system of farming to maintain the fertility of soil. Vegetables are the main source of vitamins and minerals. Vegetable crops also offer better crop diversification and crop intensification. India is the second largest vegetables producer in the world next to China; however, it's per capita per day availability is well below 92 gm whereas as per recommendation every adult is to consume 250-300 gm of vegetables per day. To make sufficiency of vegetables per capita per day availability according to nation requirement will done through protected cultivation.

As per database published by National Horticulture Board (NHB), during 2012-13 the vegetable crops in India occupy only 2.8 per cent of the total cultivated land, producing 162.19 million metric tonnes of vegetables annually from a cropped area of 9.21 million hectares. In the year 2013-14, the area and production of vegetables in Haryana was 373.17 thousand hectares and 5.5 lakh tonne respectively. For the year 2014-15, a target of 3.75 lakh hectare areas with production of 6.0 lakh tonne has been fixed and out of which an area of 2.80 lakh hectares with production of 3.20 lakh tonnes has been achieved up to December, 2014. The present production is not sufficient to meet the requirement. The target can be achieved by bringing additional area under vegetable crops, using hybrid seeds, improved agro techniques and perfection and promotion of protected cultivation of vegetables [1].

Environmental stress is the primary cause of crop losses worldwide, reducing average yields for most major crops by more than 50%. The tropical vegetable production environment is a mixture of conditions that varies with season and region. Climatic changes will influence the severity of environmental stress imposed on vegetable crops. Moreover, increasing temperatures, reduced irrigation water availability, flooding, and salinity will be major limiting factors in sustaining and increasing vegetable productivity.

Extreme climatic conditions will also negatively impact soil fertility and increase soil erosion. Thus, additional fertilizer application or improved nutrient-use efficiency of crops will be needed to maintain productivity or harness the potential for enhanced crop growth due to increased atmospheric CO_2.

A significant change in climate on a global scale will impact vegetable cultivation and agriculture as a whole; consequently, affect the world's food supply. Climatic variability is not necessarily harmful; the problems arise from extreme events that are difficult to predict. More erratic rainfall patterns and unpredictable high temperature spells consequently reduce crop productivity. Vegetables are generally sensitive to environmental extremes and thus high temperatures and limited soil moisture are the major causes of low yields and will be further magnified by climate change. Protected cultivation is very helpful to provide the favourable condition that vegetable cultivation is needed.

A polyhouse is a type of protected structure in which plants are grown under a controlled condition. These structures range in size from small sheds to industrial-sized buildings. A polyhouse may have different types of covering materials, such as a plastic roof and frequently, plastic walls; it heats up because incoming visible sunshine is absorbed inside the structure. Air warmed by the heat from warmed interior surfaces is retained in the building by the roof and wall; the air that is warmed near the ground is prevented from rising indefinitely and flowing away. Commercial polyhouses are often high-tech production facilities for fruit, vegetables and flowers. These polyhouses consist of equipment like screening installations, heating, cooling, & lighting and may be automatically controlled by a computer.

Protected cultivation of vegetables offers distinct advantages of quality, productivity and favourable market price to the growers. Vegetable growers can substantially increase their income by protected cultivation of vegetables in off-season as the vegetables produced during their normal season generally do not fetch good returns due to large availability of these vegetable in the markets. Off-season cultivation of cucurbits under low plastic tunnels is one of the most profitable technologies under northern plains of India. Insect proof net houses can be used for virus-free cultivation of tomato, chilli, sweet pepper and other vegetables mainly during the rainy season. These low-cost structures are also suitable for growing pesticide-free green vegetables. Low cost greenhouses can be used for high quality vegetable cultivation for long duration (6-10 months) mainly in peri-urban areas of the country to fetch commensurate price of produces. Polytrenches have proved extremely useful for growing vegetables under cold desert conditions in upper reaches of Himalayas in the country [7].

India has a wide spectrum of diverse agro-climatic conditions but vegetable cultivation practices in India have been generally restricted to regional and seasonal needs. In several parts of the country, especially in northern plains, the soils are highly fertile but extremes of temperatures ranging from 0°C to 48°C during a year do not allow year-round outdoor vegetable cultivation. During winter season under north Indian conditions, it is extremely difficult to grow capsicum, cucumber in open field conditions; however various types of protected structures have been developed for growing some high value crops continuously by providing favorable environment condition and giving protection from the excessive cold. The hi-tech production of vegetables under protected conditions is the recent development in this field. Protected cultivation is capital intensive and has capacity not only to increase the productivity of vegetables by many folds but also improves the quality of vegetables [8]. In several parts of the country biotic stresses during rainy and post rainy season do not allow successful vegetable cultivation. As a result, most of the vegetables are damaged by the severe incidence of viruses. Protected structures covered with insect proof nets (insect proof net houses) provide a big opportunity of virus free vegetable cultivation even on a commercial scale [8]. However, vegetable crops are confronted with numerous production and marketing problems and constraints due to their highly perishable nature, high-tech requirements, costly planting material/seeds, inputs, etc. Thus, for encouraging the production and efficient marketing of these crops, various problems and constraints in their production and marketing with which they are confronted with, are needed to be identified [3]. Thus, protected cultivation of vegetable crops may give a boost to vegetable production in the state on the one hand and also can be helpful in diversifying Haryana agriculture on the other. However, as the polyhouse cultivation is new technology in Haryana agriculture, there is a need to study the economic aspects of this technology. The specific objectives of the study were to check out the status and constraints in vegetable production under protected condition.

MATERIAL AND METHODS

This section deals with the methodological part adopted for the study. The quality of any research is judged on the basis of methodological approaches adopted. It is a way to systematically solve the research problem. It explains not only the steps adopted by a researcher in studying the research problem but also the logic behind them.

Study area

In order to achieve the stipulated objectives, present study was conducted in the Haryana state. Karnal district was purposely selected as it has the maximum number of polyhouses in the state.

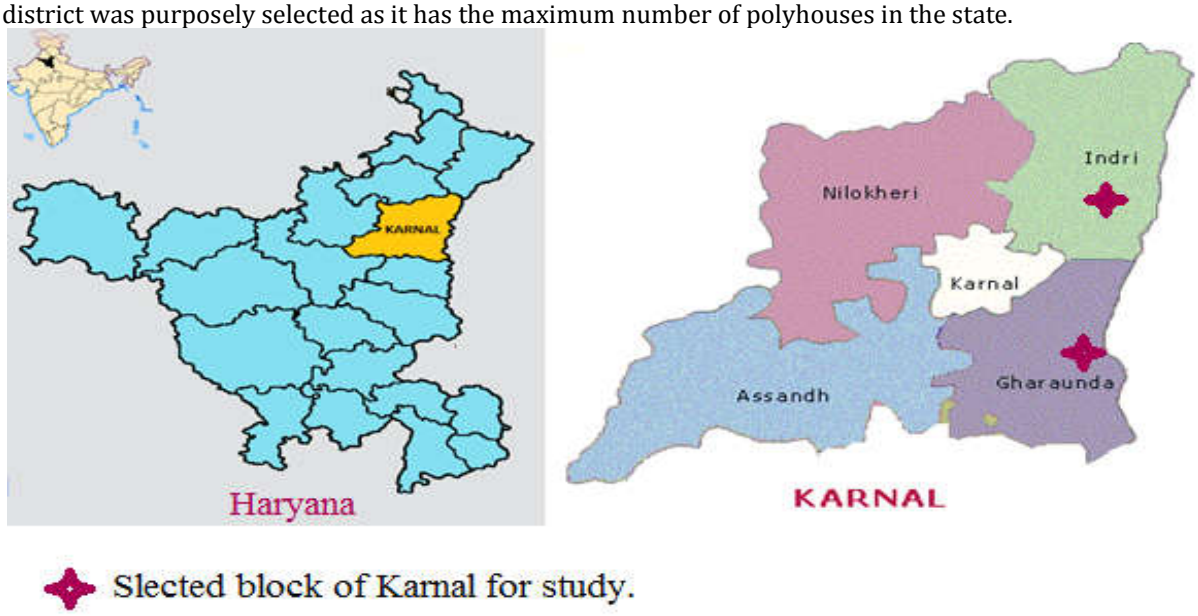

Fig-1: Map of Haryana and Karnal showing study area

Sampling procedure

To achieve the specific objective of the study, simple statistical tools like averages and percentages were used to compare, contrast and interpret the results properly. To collect the primary data, multistage random sampling technique was used. The multistage sampling is the probability sampling technique wherein the sampling is carried out in several stages such that the sample size gets reduced at each stage. The multistage sampling is an extension form of cluster sampling. While in the multistage sampling technique, the first level is similar to that of the cluster sampling, where the clusters are formed out of the population, but further, these clusters are sub-divided into smaller targeting groups, i.e. sub-clusters and then the subject from each sub-cluster are chosen randomly. Further, the stages can be added depending on the nature of research and the size of the population under study.

The primary data of vegetable cultivation under polyhouse for the Karnal district of Haryana has been utilized in keeping view the objectives of the study. Karnal district was purposely selected on the basis of predominance of vegetable cultivation under polyhouse. Gharaunda and Indri blocks were selected on the basis of predominance vegetable cultivation under polyhouse. There after two villages from each block were selected. Ten respondent farmers under polyhouses were randomly selected from each village.

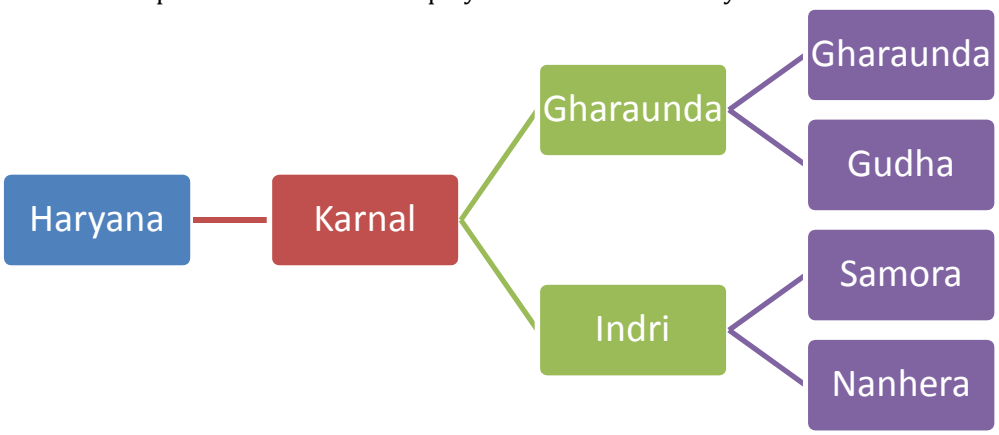

Fig-2: Flow chart of sampling procedure

RESULTS AND DISCUSSION

In this study, we deal with the present status of polyhouse and different problems faced by growers, in production and marketing of vegetables grown under polyhouses. In this process, the problems faced by farming community under polyhouses cultivation has attained a paramount significance. Under polyhouse cultivation, the farmers have many problems in production and marketing of vegetables. The

selected farmers were contacted through opinion survey for analyzing the problems in production as well as in the marketing of vegetables in study area.

To study the present status of polyhouse cultivation in Haryana

Data pertaining in Table 1 was collected from all District Horticulture Offices and Department of Horticulture, Haryana. The total number of polyhouses in Haryana during the year 2014-15 was 1356 from which Hi-Tech Polyhouses (HTPH) was 5; Natural Ventilated Polyhouses (NVPH) 1010, Net Houses (NH) 267 and Walk in Tunnels (WIT) were 74, respectively. Maximum no. of polyhouses was observed in Karnal (220) district such as HTPH-3, NVPH-165, NH-51, WIT-1 followed by Sonipat (183), Rohtak (156), Bhiwani (97), Hisar (84) and Panipat (83), respectively. While, minimum number of polyhouses i.e. 10 found in Mahendergarh district of Haryana.

Constraints in production of vegetable cultivation under polyhouse

An attempt was made to analyze the constraints responsible for lower yield on the producer's farm. The major problems faced by the farmers in the production of vegetables under polyhouses presented in Table 2.

The major problems faced by the farmers in the production of vegetable under polyhouse are presented in Table 2. The major constraint in polyhouse cultivation is short life of polyethylene sheet (92.5%) because the life of polyethylene sheet is less and was damaged during high wind flow. Problem of nematode and whitefly (90%) were also the main constraint because it damages the plants and reduce the production. High cost of fertilizer (82.5%) is also the major constraint in polyhouse cultivation. High cost of seed (77.5%) is also accounts as a major constraint because in polyhouse specific variety of seed/seedling were grown. Lack of availability and high price of polyhouse material (77.5%) were also a major constraint because low cost alternate material is not available and the material which was available that was costly and limited. Due to instantly weather fluctuation (62.5%) in the study area the polyethylene sheet was damaged and the temperature in polyhouse in drastically changes due to this mortality of plant and incidence of insect occurred in polyhouse. There was fear to failure of technology (60%) due to less knowledge about polyhouse cultivation among the farmers. Knowledge about latest package practice (60%) in production of vegetables is must but due to lack of latest package of practices, it was constraint in polyhouse cultivation. Weed infestation (45%) in polyhouse cause problem in polyhouse cultivation because weeds create competition for nutrient and place and retard the growth of vegetable seedlings. High cost of labour (40%) was constraint in production of vegetable in polyhouse because in polyhouse, skilled labours were used that was costly. Lack of availability of fertilizer on appropriate time (35%) is also hinder in production of vegetables. Availability of quality seed (20%) may not come under major constraint but still it negatively affects the production. Findings are agreement with the study Kumar *et al.* [2] and conclude that short life of polyethylene sheet, infestation of nematodes and whitefly, high cost of fertilizer and high cost of seed was one of the major production constraints in polyhouse. Lack of minimum support price, high price fluctuations and heavy loses of vegetables in market were the major marketing constraints. Sharma *et al.* [6] conducted a survey to determine the status of phytoparasitic nematodes associated with vegetable crops under polyhouse conditions. Samantaray *et al.* [5] reported various constraints faced by the growers in vegetable production while Mohanty *et al.* [4] concluded that farmers in Sikkim mostly prefer to grow vegetables round the year as it gives better and quick return as compared to other crops under organic condition. Despite helpful to the environment for vegetable cultivation, the vegetable growers of North district of Sikkim are facing various types of constraints in adoption of scientific vegetable production technologies.

Constraints in marketing of polyhouse vegetable

It can be seen from the Table 3 that in the study area, lack of minimum support price (MSP) was the biggest and main problem of the vegetable growers in marketing of their produce as reported by 92.5 per cent because there is no MSP fixed for the vegetables. High price fluctuation (87.5%) accounts as a major constraint because low price for their produce at the time of harvesting and seasonal glut and open field produce get in the way to fetch more price of polyhouse produce. Due to the inadequate Market information (75%) farmer confused to where they sell their produce and in which market they get higher price of their produce. Market information is more important from the producers' point of view because this gives them an idea about the prevailing price of the produce in the market. High cost of transportation (70%) was also a big problem faced by farmer in study area. Malpractices in weighing (65%) obstruct in fetching the accurate weight of produce. Inadequate availability of quality packing material at genuine price (52.5%) is a big problem to gain a good price of produce. Proper market place is not available in market due to this heavy loss of vegetables in market (42.5%) and Lack of transportation facility (25%) also affects in study area.

Table 1: District wise status of polyhouses in Haryana

S. No.	Districts	Total Number	HTPH	NVPH	NH	WIT
1	Karnal	220	3	165	51	1
2	Sonipat	183	2	136	36	9
3	Rohtak	156	-	129	27	-
4	Bhiwani	97	-	65	29	3
5	Hisar	84	-	46	11	27
6	Panipat	83	-	50	20	13
7	Panchkula	77	-	46	25	6
8	Kurukshetra	58	-	34	17	7
9	Jhajjar	57	-	48	7	2
10	Ambala	45	-	22	23	-
11	Jind	44	-	36	6	2
12	Kaithal	42	-	39	2	1
13	Gurgaon	38	-	36	2	-
14	Sirsa	38	-	31	7	-
15	Rewari	29	-	27	1	1
16	Yamunanagar	25	-	25	-	-
17	Fridabad	22	-	20	1	1
18	Fatehabad	19	-	19	-	-
19	Palwal	17	-	17	-	-
20	Mewat	12	-	10	1	1
21	Mahendergarh	10	-	9	1	-
	Total	**1356**	**5**	**1010**	**267**	**74**

Source: District Horticulture Offices and Department of Horticulture, Haryana

Table 2: Constraints in vegetable production in Karnal district of Haryana

Particulars	Frequency	Percentage (%)	Ranking
Short life of polyethylene sheet	37	92.5	1
Infestation of insect, nematode and disease	36	90	2
High cost of fertilizer	33	82.5	3
High cost of seed	31	77.5	4
Lack of availability of polyhouse material	31	77.5	4
High weather fluctuation	25	62.5	5
Fear to failure of technology	24	60	6
Lack of knowledge of latest package of practices	25	60	6
Weed infestation	18	45	7
High cost of labour	16	40	8
Lack of availability of fertilizer at appropriate time	14	35	9
Lack of skilled labour	12	30	10
Scarcity of labour	9	22.5	11
Lack of availability of quality seed	8	20	12

Table 3: Constraints in marketing of vegetables in Karnal district of Haryana

Particulars	Frequency	Percentage (%)	Ranking
Lack of minimum support price	37	92.5	1
High price fluctuation	35	87.5	2
Lack of market information	30	75	3
High cost of transportation	28	70	4
Malpractices in weighing	26	65	5
Lack of quality packing material	21	52.5	6
Heavy market loss	17	42.5	7
Lack of transportation facility	10	25	8

CONCLUSION

The study revealed that the maximum number polyhouse were found in Karnal district while minimum number polyhouse was observed in Mahendergarh district of Haryana. Short life of polyethylene sheet is major production constraint in case of polyhouse as weather conditions changes instantly. Infestation of nematodes and whitefly, high cost of fertilizer and high cost of seed was one of the major production constraints in polyhouses. High weather fluctuations, fear of failure of technology, lack of knowledge about latest package of practices and weed infestation negatively affected the production in polyhouses. Lack of minimum support price, high price fluctuations and lack of knowledge regarding market information, high cost of transportation, malpractices in weighing, lack of adequate packing material and heavy loses of vegetables in market were the major marketing constraints.

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