

## Socio-economic Impact Assessment of Protected Cultivation in Haryana: A Sociological Analysis

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### ABSTRACT

Protected cultivation technology facilitates producing crops with great productivity and outstanding quality. It also creates jobs, increases farm income, brings in foreign exchange and makes efficient use of limited agricultural area. The present study was conducted in Hisar and Karnal districts of Haryana state with an objective to analyze the socio-economic impact of protected cultivation on farmers and major constraints faced by them. The sample of 80 respondents was selected from these two districts through systemic random sampling techniques. The results revealed that farmers had high extent of investment in the quality education of their children, increased mass media exposure, affected saving deposits, increased urban and extension contacts, increased expenditure on the performance of social ceremonies and increased household assets. The major constraints faced by the respondents were scarcity of skilled labour during peak season, high perishability of the flowers and vegetables and fluctuation in market price, respectively. The capacity-building program should be implemented to raise awareness among farmers about the profitability of protected cultivation as an agribusiness industry in India. Hence, government may consider training the farmers on protected cultivation for skill development.

**Key words:** Protected cultivation, socio-economic impact, constraints WMS, rank

### INTRODUCTION

Protected cultivation is an innovative approach to growing both seasonal and off-season crops in a controlled environment. This method holds significant potential for increasing vegetable and flower crop production, creating job opportunities, optimizing land use and boosting exports. The success of protected cultivation technology has prompted global research and projects aimed at overcoming agronomic challenges and ensuring year-round crop production. Pachiyappan *et al.* (2022) reported that this technology not only enables the production of high-quality, high-yield crops but also contributes to job creation, higher farm incomes, foreign exchange earnings, and more efficient use of limited agricultural land. According to Punera *et al.* (2017) in the realm of horticultural crops, protected cultivation is recognized as a highly profitable venture. However, in India, the adoption of protected cultivation is still in its early stages, with a mere 0.2% penetration compared to countries like the Netherlands, Turkey and Israel.

Currently, the area designated for protected cultivation in India is approximately 50,000 hectares, with around 2,000 hectares dedicated to protected vegetable cultivation (Amita, 2020). The liberalization of industrial and trade policies has spurred growth in cut flower exports, prompting national and state governments in India to implement policies and incentives that have led to a notable increase in the area under protected cultivation. In north India, where agriculture serves as the backbone of the economy, the adoption of protected cultivation presents a promising opportunity to enhance agricultural productivity, livelihoods and have a positive impact on the socio-economic status of farmers. Deriving a livelihood through protected agriculture entails relying primarily on farming activities conducted within controlled and sheltered environments. The farmers engaged in protected agriculture invest in technology, infrastructure and knowledge to create optimal growing conditions, leading to higher productivity, extended growing seasons and improved crop

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quality. Protected cultivation offers a more stable income, sustainability benefits, year-round production and increased food security. However, Thakur *et al.* (2023) mentioned that protected cultivation demands expertise, investment and crop-specific knowledge. According to the Working Group Report on Development of Protected Cultivation in Haryana state; Haryana has emerged as a major producer of button mushrooms because of the use of black polyethene-protected structures in the wasteland, particularly in the Sonapat and Panipat districts (Vikash and Meena, 2022). Ghanghas *et al.* (2018) studied that production and productivity of poly houses had significantly improved in several key areas, including land, water, energy and labour efficiency. This method yields high-quality, clean products while maximizing water and fertilizer use efficiency. Additionally, government subsidies for establishing high-cost infrastructure and the potential for year round employment for farmers further enhance its appeal.

Haryana, located on the outskirts of New Delhi, is a major supplier of vegetables and fruits, and the rising population has increased the demand for these crops. According to Kumar *et al.* (2018) protected cultivation could significantly boost vegetable production in the state and help diversify agriculture. Poly house farming enables farmers to generate income throughout the year by cultivating multiple crops and achieving better prices for off-season produce. Therefore, it is essential to analyze the socio-economic impacts of this technology and address the key challenges faced by farmers to fully realize its potential in modernizing agriculture in Haryana.

## METHODOLOGY

The study was carried out in 2023-24 in Haryana. There are 22 districts in Haryana state. Out of these, two districts, namely, Karnal and Hisar, were selected purposively for primary data collection where the maximum numbers of protected structures were existing in the state as per the information available on the site of Horticulture Department of Haryana. Forty farmers were selected from each selected district. Thus, on the whole, a sample of 80 respondents was selected from Karnal and

Hisar districts for the purpose of the study for assessing the socio-economic impact of protected cultivation on farmers. Data were collected with a well prepared and pre-tested interview schedule by personal interviews with the respondents at their home/ farm. Further the data were tabulated and analyzed using MS Excel, OP STAT for computing the frequency, percentage, weighted score, average mean score and extent for better interpretation of data. The interview of every farmer was taken separately so that others did not influence their response.

## RESULTS AND DISCUSSION

The analysis of data revealed that half of the respondents (50.00%) hailed from 36-50 years age group followed by above 50 years of age group (30.00%) and 20.00% who fell in the age group of up to 35 years (Table 1). The education is an indicator of a nation's human resources. Increased knowledge is influenced by increased literacy rates, which implies the adoption of new innovations and technologies and it was found that nearly two-fifth of the respondents (37.50%) were educated up to senior secondary school level, followed by up to secondary school (26.25%), graduation and above (21.25%), whereas 15% were found to be illiterate. Analysis regarding the caste of the respondents revealed that more than three-fourth of the farmers (63.75%) were from the general category, followed by 26.25% who belonged to the backward caste and 10.00% belonging to the scheduled caste. Nearly two-third of the respondents (57.50%) belonged to the nuclear family and 42.50% belonged to the joint family. It was also observed that 43.75% of the respondents had a family size of up to four members; followed by 37.50% between 5-8 members and 18.75% had a family size above eight members. In the context of land holdings, two-fifth of the respondents (40.00%) were small farmers (2.6-5.0 acres) followed by 27.50% who were semi-medium (5.1-10 acres), 13.75% were marginal (up to 2.5 acres) and 12.50% were large farmers (more than 25 acres). Regarding subsidiary occupation, it was found that nearly three-fifth of the respondents (56.25%) were not engaged in any subsidiary occupations, followed by 18.75% in government service, 13.75% doing dairy as a secondary occupation and 11.25% in business. Whereas,

**Table 1.** Socio-economic profile of the respondents (n = 80)

Independent variables	Karnal (n=40)	Hisar (n=40)	Total (n=80)
<b>Age</b>			
Up to 35 years	05 (12.50)	11 (27.50)	16 (20.00)
36-50 years	27 (67.50)	13 (32.50)	40 (50.00)
Above 50 years	08 (20.00)	16 (40.00)	24 (30.00)
<b>Educational level</b>			
Illiterate	05 (12.50)	07 (17.50)	12 (15.00)
Up to secondary school	09 (22.50)	12 (30.00)	21 (26.25)
Senior secondary school	17 (42.50)	13 (32.50)	30 (37.50)
Graduation and above	09 (22.50)	08 (20.00)	17 (21.25)
<b>Caste</b>			
General caste	25 (62.50)	26 (65.00)	51 (63.75)
Backward caste	13 (32.50)	08 (20.00)	21 (26.25)
Scheduled caste	02 (05.00)	06 (15.00)	08 (10.00)
<b>Subsidiary occupation</b>			
Nil	21 (52.50)	24 (60.00)	45 (56.25)
Dairy	02 (05.00)	09 (22.50)	11 (13.75)
Business	06 (15.00)	03 (07.50)	09 (11.25)
Government service	11 (27.50)	04 (10.00)	15 (18.75)
<b>Annual income (Rs.)</b>			
Up 3 lacs	03 (07.50)	10 (25.00)	13 (16.25)
3.1-5 lacs	21 (52.50)	14 (35.00)	35 (43.75)
Above 5 lacs	16 (40.00)	16 (40.00)	32 (40.00)
<b>Family type</b>			
Nuclear	19 (47.50)	27 (67.50)	46 (57.50)
Joint	21 (52.50)	13 (32.50)	34 (42.50)
<b>Family size</b>			
Up to four members	13 (32.50)	22 (55.00)	35 (43.75)
Between 5-8 members	19 (47.50)	11 (27.50)	30 (37.50)
Above 8 members	08 (20.00)	07 (17.50)	15 (18.75)
<b>Land holdings</b>			
Marginal (up to 2.5 acres)	06 (15.00)	05 (12.50)	11 (13.75)
Small (2.6-5.0 acres)	23 (57.50)	09 (22.50)	32 (40.00)
Semi-medium (5.1-10 acres)	15 (37.50)	05 (12.50)	20 (25.00)
Medium (10.1-25 acre)	02 (05.00)	05 (12.50)	07 (08.75)
Large (more than 25 acres)	06 (15.00)	04 (10.00)	10 (12.50)
<b>Land under protected cultivation</b>			
Up to 1 acre	07 (17.50)	07 (17.50)	14 (17.50)
1-2.5 acres	21 (52.50)	20 (50.00)	41 (51.25)
More than 2.5 acres	12 (30.00)	13 (32.50)	25 (31.25)
<b>Social participation</b>			
Not member of any organization	23 (57.50)	16 (40.00)	39 (48.75)
Member of one organization	11 (27.50)	13 (32.50)	24 (30.00)
Member of more than one organization	06 (15.00)	11 (27.50)	17 (21.25)
<b>Mass media exposure</b>			
Low (5-7)	05 (12.50)	14 (35.00)	19 (23.75)
Medium (8-11)	22 (55.00)	17 (42.50)	39 (48.75)
High (12-15)	13 (32.50)	09 (22.50)	22 (27.50)
<b>Extension contacts</b>			
Low (5-7)	09 (22.50)	08 (20.00)	17 (21.25)
Medium (8-11)	15 (37.50)	14 (35.00)	29 (36.25)
High (12-15)	16 (40.00)	18 (45.00)	34 (42.50)
<b>Socio-economic status</b>			
Low (3-5)	04 (10.00)	04 (10.00)	08 (10.00)
Medium (6-8)	25 (62.50)	24 (60.00)	49 (61.25)
High (9-11)	11 (27.50)	12 (30.00)	23 (28.75)

Figures in parentheses denote percentages.

more than two-fifth of the respondents (43.75%) had an annual income between Rs. 3-5 lacs, followed by 40.00% who had income above Rs. 5 lacs, and 16.25% had annual income up to Rs. 3 lacs. The analysis of the data also revealed that nearly half of the respondents (48.75%) were not members of any type of social organization, while 30.00% were members of one organization and 21.25% were members of more than one organizations. About half of the respondents (48.75%) had a medium level of mass media exposure, whereas less than one-third (23.75%) had a low level of mass media exposure. The extension contacts are needed to make people aware about any new technology and it was found more than two-fifth of the respondents (42.50%) had a high level of extension contacts, followed by a medium level (36.25%). It was also found that more than three-fifth of the respondents (61.25%) had a medium level of socio-economic status, followed by a high level (28.75%) and a low level (10.00%) of socio-economic status. SES status relies on multiple parameters such as education, annual income and land holding. Pachiyappan *et al.* (2022) found similar results in their research and concluded that the majority of farmers were between 30 to 45 years of age group, with an intermediate level of education and engaged in farming by profession.

The socio-economic impact of protected cultivation on the various statements resulted high for investment in the quality education of their children, increased mass media exposure, saving deposits, urban and extension contacts increased, expenditure on the performance of social ceremonies increased, and household assets increased,

with weighted mean score of 2.73, 2.60, 2.57, 2.52, 2.48 and 2.46, respectively (Table 2). However, medium for quality of medical treatment, farm implements and status of old loans with weighted mean score of 2.20, 2.12 and 1.82, respectively. At last the impact was low for agricultural land on lease with weighted mean score of 1.50. Similarly, Mehta *et al.* (2020) had earlier reported that protected cultivation had a significant impact on enhancing crop productivity, average farm and household income and improving the socio-economic conditions of the farmers. These results are also in line with the study of Ruli *et al.* (2022), who concluded that there was substantial improvement in annual income, employment generation, material possession and social status of the respondents after the adoption of protected cultivation.

Regarding constraints faced by the respondents, rank 1<sup>st</sup> was given to the respondents who faced scarcity of labour during peak season as farmers observed that lack of labour during the peak season impacted protected cultivation. This is in line with the study of Ruli *et al.* (2022). Since the labour demand was higher, the wages automatically increased, and the labour cost was higher in the study area. The high perishability of the flowers and vegetables ranked 2<sup>nd</sup>. Because there were no cold chain facilities for the farmers in the study area and these crops were not included in the crop insurance scheme, hence, most of the farmers found it as a major constraint. The high cost of transportation was given the 3<sup>rd</sup> rank and the 4<sup>th</sup> rank was given to the high cost of skilled labour. Similarly, distress sale because of urgent financial need got the 5<sup>th</sup> rank, followed by the 6<sup>th</sup> rank which

**Table 2.** Cumulative socio-economic impact of protected cultivation (n=80)

Socio-economic impact statements	Increase	Decrease	No change	WS	WMS	Extent
Investment in quality education of their children	66	07	07	219	2.73	High
Expenditure on performance of social ceremonies increased	54	09	17	197	2.46	High
Status of old loans	14	38	28	146	1.82	Medium
Savings/ deposits affected	59	08	13	206	2.57	High
Household assets increased	56	07	17	199	2.48	High
Quality of medical treatment	43	10	27	176	2.20	Medium
Agricultural land on lease	55	10	15	200	1.50	Low
Mass media exposure increased	62	04	14	208	2.60	High
Urban and extension contacts	59	04	17	202	2.52	High
Farm implements increased	40	10	30	170	2.12	Medium

Low = 1-1.66, Medium = 1.67-2.33 and High = 2.34-3.00.

**Table 3.** Major constraints faced by the respondents (n=80)

Constraints	Very serious (3)	Serious (2)	Not so serious (1)	WMS	Rank
Scarcity of labour during peak seasons	59	15	06	2.66	I
Relatively higher perishability of vegetables/flowers	54	24	02	2.65	II
High cost of transportation	55	20	05	2.62	III
High cost of skilled labour	50	26	04	2.57	IV
Distress sale because of urgent financial need	53	13	14	2.48	V
Fluctuation in market prices	55	06	19	2.45	VI
High initial investment in construction of poly house	36	41	03	2.41	VII
Lack of marketing facilities at local place	40	23	17	2.28	VIII
Highly fluctuating weather conditions	29	36	15	2.175	IX
Occurrence of pest and diseases	17	49	14	2.03	X
Lack of timely access to high-quality inputs, such as insecticides and pesticides	19	23	38	1.76	XI

was given to fluctuation in market price. The volatility of the price in the market might be the possible reason for considering the price fluctuation as major constraint. High initial investment in the construction of poly houses was given rank 7<sup>th</sup> and rank 8<sup>th</sup> was given to lack of marketing facilities at local places. Likewise, highly fluctuating weather conditions were given rank 9<sup>th</sup>, followed by rank 10<sup>th</sup>, which was given to the occurrence of pests and diseases and at last rank 11<sup>th</sup> was given to the lack of timely access to high-quality inputs, such as insecticides and pesticides, respectively (Table 3). These findings align with the study conducted by Prabhakar *et al.* (2017), who reported that while farmers quickly adopted protected cultivation, they encountered several significant challenges. These included high initial investment costs, limited access to quality planting materials and inputs, inadequate post-harvest infrastructure and a lack of supportive price policies.

## CONCLUSION

The present study was conducted in a few villages in Hisar and Karnal districts of Haryana state which revealed that half of the respondents (50.00%) hailed from 36-50 years age group, nearly two-fifths of the respondents (37.50%) were educated up to senior secondary school level, more than three-fourths of the farmers (63.75%) were from the general category, two-fifth of the respondents (40.00%) were small farmers,

having income above Rs. 5 lacs and more than three-fifth of the respondents (61.25%) had a medium level of socio-economic status relied on multiple parameters such as education, annual income and land holding. The socio-economic impact of protected cultivation had resulted high for investment in the quality education of their children, increased mass media exposure, affected saving deposits, increased urban and extension contacts, increased expenditure on the performance of social ceremonies and increased household assets. The major constraints faced by the respondents were scarcity of skilled labour during peak season. Hence, government may consider training the farmers on protected cultivation skills for skill development in protected cultivation. High perishability of the flowers and vegetables suggested that cold storage facilities should be provided for perishable crops, high cost of transportation, distress sales due to an immediate need for money, and fluctuation in market price, etc.

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