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**Rajesh CM**  
Ph.D. Scholar, Department of  
Agricultural Extension,  
University of Agricultural  
Sciences, GKVK, Bengaluru,  
Karnataka, India

**Shivalingaiah YN**  
Professor, Department of  
Agricultural Extension,  
University of Agricultural  
Sciences, GKVK, Bengaluru,  
Karnataka, India

**Savitha CM**  
Assistant Professor, Department  
of Agricultural Extension,  
University of Agricultural  
Sciences, GKVK, Bengaluru,  
Karnataka, India

**Corresponding Author**  
**Rajesh CM**  
Ph.D. Scholar, Department of  
Agricultural Extension,  
University of Agricultural  
Sciences, GKVK, Bengaluru,  
Karnataka, India

## An analysis of constraints in adoption and strategies to promote the protected cultivation among the capsicum growers

**Rajesh CM, Shivalingaiah YN and Savitha CM**

### Abstract

The study was conducted in Karnataka regarding constraints and suggestions of protected cultivation capsicum growers in production and marketing of capsicum were achieved by applying mean and standard deviation. After preparing the questionnaires the data were collected by survey method pertaining to the agricultural year 2019-20. The farmers faced environmental, technical, labour, economic and marketing constraints in harnessing profitability and sustainability of this technology. The major constraints in rapid adoption were high initial investment, poor availability of quality planting material and inputs, poor post-harvest infrastructure and absence of price policy measures. All the stakeholders agreed that R&D initiatives were required to develop low cost designs and reduce the cost of cultivation under polyhouse. Farmers' ability to successfully integrate this technology to suit their socio-economic and agro-ecological conditions would further affect its profitability and sustainability.

**Keywords:** capsicum, protected cultivation, constraints, suggestions, Karnataka

### Introduction

India is predominantly an agriculture-based country. More than two third of the population in India depends on agriculture for their livelihood. Vegetables form major and important part of our dietary requirements, which are widely grown in the rural and peri-urban areas. Hi-tech horticulture including protected cultivation of high value and exotic vegetables has been on the increase, targeting high end domestic and export market. Under protected cultivation, capsicums are widely grown due to higher productivity and economic feasibility. Capsicum (sweet Pepper or bell Pepper), also popularly called as Simla Mirch in India is one of the leading vegetables grown in open conditions as well as under protected conditions. Because of its economic importance as a high value vegetable crop both in domestic and overseas markets due to more consumer preferences and use in various culinary products, quality production of capsicum is the need of the day. This has led to production of capsicum under protected conditions to meet the standards of different markets prompting popularity of this crop as an enterprise in urban and peri urban areas. The crop, once the domain of only the rich and elite farmers has today become a successful and profitable enterprise for small and marginal farmers also. Of late, production of capsicum in protected conditions under poly/net houses has been facing many production and crop protection problems because of emergence of new challenges like emergence of new pests, soil borne diseases, micro nutrient deficiencies etc and a non organized sector of this crop is also facing the problem of marketability (Technical bulletin No.22 IIHR).

Karnataka occupies a predominant place in the Horticultural map of our country. Horticulture generates 40.00 per cent of the total income of the state. This accounts for 17.00 per cent of the GDP of the state (Anonymous 2019) <sup>[1]</sup>. The leading states in the area of protected cultivation are Maharashtra, Karnataka, Himachal Pradesh, and North-eastern states, Uttarakhand, Tamilnadu and Punjab (Shwetha *et al.* 2016) <sup>[7]</sup>. The area under polyhouse in Chikkaballapur district is 161.75 ha out of which 21.00 ha under capsicum, 16.00 ha under chrysanthemum in Chikkaballapur taluk and 28.00 ha under capsicum. The objective of the study is to document constraints faced by growers under protected cultivation and to seek their suggestions to enhance the productivity under protected cultivation.

### Materials and Methodology

A farm level interview was conducted by using pre-tested interview scheduled in the

Chikkaballapur district which comes under eastern dry zone (Zone-V) of Karnataka. In Chikkaballapur district, two taluks i.e. Sidlaghatta and Chikkaballapur taluks were purposefully selected for the study, since this taluk are having more area under protected cultivation technology. The study was conducted during 2020. In Capsicum cultivation under protected cultivation of 50 sample farmers selected for the present study. In the present investigation, ex-post facto research design was used. This design was considered appropriate, as it is a systematic empirical enquiry for measuring the phenomenon, which has already occurred and is continuing. Constraints were listed and the farmers were asked to indicate the constraints faced by them apart from open ended questions the responses of the farmers were collected for present study on a two-point continuum 'yes' or 'no'. A score of 'one' was assigned for 'yes' response and '0' for no response. Some of the suggestions were listed and the farmers were asked to indicate the suggestions them apart from open ended questions the responses of the farmers were collected for present study on a two-point continuum 'yes' or 'no'. A score of 'one' was assigned for 'yes' response and '0' for no response. a structured schedule was prepared with the help of experts in the field of Agricultural Extension, Agricultural economics and marketing which included all the variables in the study. The minor ambiguous items were re-constructed by the suggestions given by the experts and the final interview schedule was prepared. Data collection was done by personal interview method with the help of the structured interview schedule. The data collection was undertaken during the month of February 2020. The constraints and suggestions mentioned by farmers were content analyzed for proper analysis and interpretation of facts.

### Results and Discussion

Constraints are the restrictions or problems faced by the farmers in the process of cultivation. The total numbers of constraints selected for the study were Thirty. Constraints faced by the farmers can be categorized as follows:

#### Production constraints

A close examination of Table 1 shows that a great majority of the capsicum growers perceived that perishable nature of vegetables (96.00%), scarcity of water for irrigation (94.00%), occurrence of pest and diseases (90.00%) as major constraints followed by low soil fertility status (70.00%) and poor drainage of soil (56.00%) as other constraints in crop production.

The capsicum grown under polyhouse conditions are highly perishable. The success of polyhouse technologies and its

efficiency also depend on the access to market and efficient supply chain management. Irrigation is also crucial for the success of polyhouse cultivation. The absorption of externally applied nutrients by plants from soil requires adequate moisture in the soil, lack of irrigation at critical stages of crop growth will affect adversely on yields, excessive use of irrigation is also a serious problem under polyhouse conditions leading to poor drainage in soil and imbalances in soil fertility status, occurrence of pest and diseases inside the polyhouse sometimes exceed when compared to open cultivation because of favourable climatic conditions (high moisture and humidity) inside the polyhouse. This may lead to malformation of capsicum which will fetch very little price in the market apart from incidence of pest and disease in crops under protected cultivation. Over-exploitation of nutrients from soil has led to their decline in fertility status.

**Table 1:** Production constraints as perceived by capsicum growers under protected cultivation (n=50)

Sl.no	Constraints	Number	Per cent	Rank
<b>Production constraints</b>				
1	Perishable nature of vegetables	48	96.00	I
2	Scarcity of water for irrigation	47	94.00	II
3	Occurrence of pest and diseases	45	90.00	III
4	Low soil fertility status	35	70.00	IV
5	Poor drainage of soil	28	56.00	V

#### Technological

There is a lack of adequate technology in areas that will specifically benefit small farmers in (i) lack of technical knowledge, (ii) Non-availability of required quantity and quality planting material at right time (iii) Non-availability of quality inputs like pesticides and insecticides at right time (iv) Non-availability of quality PCT equipment's at local market (v) Lack of technical guidance about production techniques (vi) Irregular power supply (vii) Lack of relevant literatures in local language (vi) Difficulties in following the recommended practices. It is revealed that great majority of the capsicum growers perceived that lack of scientific knowledge about advanced production technologies under protected cultivation (96.00%) as major problem followed by non-availability of required quantity and quality planting material (90.00%), non-availability of quality inputs like pesticides and insecticides at right time (86.00%), non-availability of quality protected cultivation equipment's at local market (80.00%), lack of technical guidance about production techniques (78.00%) as other constraints (Table 2).

**Table 2:** Technological constraints as perceived by capsicum growers under protected cultivation (n=50)

Sl.no	Constraints	Number	Per cent	Rank
<b>Technical constraints</b>				
1	Lack of scientific knowledge about advanced production technologies under Protected cultivation	48	96.00	I
2	Non-availability of required quantity and quality planting material at right time	45	90.00	II
3	Non-availability of quality inputs like pesticides and insecticides at right time	43	86.00	III
4	Non-availability of quality PCT equipment's at local market	40	80.00	IV
5	Lack of technical guidance about production techniques	39	78.00	V
6	Irregular power supply	35	70.00	VI
7	Lack of relevant literatures in local language	28	56.00	VII
8	Difficulties in following the recommended practices	25	50.00	VIII

#### Labour constraints

It include (Table 3) (i) High cost of skilled labour (ii) Scarcity

of labour during peak seasons (iii) Non availability of skilled labour. The study revealed that the labour constraints faced by

the capsicum growers in which high cost of skilled labour as a majority problem (98.00%) followed by scarcity of labour during peak seasons (92.00%), and non-availability of skilled labour (84.00%). While capsicum requires a greater number of skilled labours compare to other. Migration of rural folk to urban areas in search of better jobs, alternative employment opportunities at the village level and indifferent attitude of youth towards agriculture has led to acute shortage of skilled labour especially in the peak seasons like planting/sowing and

harvesting. This has naturally raised the wage rates of skilled labour required in polyhouse cultivation. The average per day wage rates in the peak season of sowing/planting and harvesting in the open field conditions in the study area was Rs. 150/- for women and Rs. 200/- for men, whereas in the polyhouse, the per day wage rates ranged between Rs. 250-300/- for women and Rs 300-400/- for men. Hence, they expressed high cost and scarcity of labour as major constraint.

**Table 3:** Labour constraints as perceived by capsicum growers under protected cultivation (n=50)

Sl.no	Constraints	Number	Per cent	Rank
<b>Labour constraints</b>				
1	High cost of skilled labour	49	98.00	I
2	Scarcity of labour during peak seasons	46	92.00	II
3	Non-availability of skilled labour	42	84.00	III

### Economic Constraints

Economical constraints (Table 4) of the capsicum growers are problem of high initial investment in construction of poly house (98.00%) followed by high cost of planting material (94.00%), high cost of plant protection chemicals (90.00%), lack of adequate and timely disbursement of loan (84.00%), complexity of loan procedure (80.00%) are other constraints. Because of the resource constraints of the farmers, and as a result of inappropriate low technologies used by them coupled with unfavorable marketing systems, the income of the farmers is generally low and very often irregular. Existing

credit policy does not favour marginal and small farmers; instead the big and commercial farmers have been benefited. Provision of credit on the basis of single enterprise and also on the basis of collateral does not favour small farmers at all. Small farmers particularly need credit for their entire farming system activities on the basis of cumulative need rather than for a single activity (Dhurwey *et al.*, 2015) <sup>[2]</sup>, Pepijn *et al.* (2009) <sup>[3]</sup> revealed that the econometric model suggested that access to credit is an important constraint to greenhouse adoption.

**Table 4:** Economic constraints as perceived by capsicum growers under protected cultivation (n=50)

Sl.no	Constraints	Number	Per cent	Rank
<b>Economical constraints</b>				
1	High initial investment in construction of poly house	49	98.00	I
2	High cost of planting material	47	94.00	II
3	High cost of plant protection chemicals	45	90.00	III
4	Lack of adequate and timely disbursement of loan	42	84.00	IV
5	Complexity of loan procedure	40	80.00	V
6	High cost of transportation	38	76.00	VI
7	Crop insurance is not covered flowers/vegetables	35	70.00	VII

### Marketing Constraints

A great majority of the capsicum growers perceived that market price fluctuation (96.00%), lack of marketing facilities at local place (92.00%), exploitation by middleman (90.00%), lack of exclusive markets for vegetables grown under PCT (80.00%) as major constraints in Marketing (Table 5).

Singh *et al.* (2004) <sup>[8]</sup> revealed that price fluctuations, lack of proper storage facilities and non-availability of credit were the major constraints in production of onion, tomato, okra and chilly in Pune district.

In marketing of the produce, farmers are considered as price taker and not a price fixer, it is more so in crops where price

policy is completely absent as in case of flowers and vegetables. Hence, unfavourable market prices may cause huge financial losses. Farmers fetched good prices during the months of January-April and the season is generally slack during September to December but their price share is hindered by the exploitation by middleman and lack of marketing facilities at local places. The success of polyhouse cultivation and its economic viability also depends on accessibility to market, distant markets leading problems of transportation means, higher cost of transportation, fluctuation in prices of vegetables make farmers prone to distress sale of their produce.

**Table 5:** Marketing constraints as perceived by capsicum growers under protected cultivation (n=50)

Sl.no	Constraints	Number	Per cent	Rank
<b>Marketing constraints</b>				
	Market price fluctuation	48	96.00	I
1	Lack of marketing facilities at local place	46	92.00	II
2	Exploitation by middleman	45	90.00	III
3	Lack of exclusive markets for flowers/ vegetable grown under PCT	40	80.00	IV
4	Problems of transportation means	35	70.00	V
5	Difficulty in grading the produce at the production level	33	66.00	VI
6	Distress sale due to immediate need of money	30	60.00	VII

### Suggestions expressed by capsicum growers to overcome the constraints

Suggestions include Government Policy initiatives needed by capsicum growers are mentioned in Table 6. Majority of the growers suggested that intervention of government in price policy mechanism (98.00%), increasing the amount of subsidy for protected cultivation under polyhouse (96.00%),

availability of quality planting material in required quantity at right time in local market (90.00%), creation of grading, cold storage and processing facilities at farm gate level to reduce post-harvest losses (80.00%) Providing regular power supply (three phase) (70.00%) as major suggestion in case of government policy initiatives.

**Table 6:** Suggestions expressed by capsicum growers in government policy initiatives to overcome the constraints

Sl.no	Suggestions	Number	Per cent	Rank
(n=50)				
<b>1</b>	<b>Government Policy initiatives</b>			
2	Intervention of Government in price policy mechanism	49	98.00	I
3	Increasing the amount of subsidy for protected cultivation under polyhouse	48	96.00	II
4	Availability of quality planting material in required quantity at right time in local market	45	90.00	III
5	Creation of grading, cold storage and processing facilities at farm gate level to reduce post-harvest losses	40	80.00	IV
6	Providing regular power supply (three phase)	35	70.00	V

Government intervention in the price policy mechanism to prevent price fluctuation is necessary and proactive role of government is a prerequisite to boost the adoption of this technology. Favourable policy environment including measures to increase the subsidy amount and expand the

basket of beneficiary farmers; creation of infrastructure such as grading, transport, cold chain management facilities, supply of quality planting material and inputs at reasonable prices and provision of regular power supply are required to promote polyhouse technology.

**Table 7:** Suggestions expressed by capsicum growers in Research and Development Initiatives to overcome the constraints

Sl.no	Suggestions	Number	Per cent	Rank
(n=50)				
<b>Research and Development Initiatives</b>				
1	Reducing the high initial investment	48	96.00	I
2	Reducing the production cost under polyhouse	44	88.00	II
3	Standardization of designs and structure of low cost polyhouse	40	80.00	III
4	Development of user-friendly Package of Practices	36	72.00	IV
5	Standardization of production technology under polyhouse	30	60.00	V

In case of research and development initiatives, one of the suggestions expressed by growers are detailed in Table 7. Major suggestions are reducing the high initial investment (96.00%). The polyhouse technology is highly capital intensive at all stages of production of crops, hence, farmers suggested that scientists have to develop the polyhouse technologies which require low initial investment cost and

minimum operation cost. Reducing the production cost under polyhouse (88.00%), standardization of designs and structure of low cost polyhouse (72.00%), development of user-friendly Package of Practices (75.00%) and standardization of production technology under polyhouse (60.00%) as the other suggestions expressed by growers.

**Table 8:** Suggestions expressed by capsicum growers in Marketing Initiatives to overcome the constraints (n=50)

Sl.no	Suggestions	Number	Per cent	Rank
<b>Marketing Initiatives</b>				
1	Availability of raw material of required quantity at local market	46	92.00	I
2	Promotion of direct marketing	45	90.00	II
3	Creation of separate transportation facilities for national and international markets to export the produce	35	70.00	III

In case of marketing initiatives,, suggestions as opined by growers are detailed in Table 8, suggestions expressed by growers are availability of raw material of required quantity at local market (92.00%), promotion of direct marketing (90.00%) and creation of separate transportation facilities for national and international markets to export the produce (70.00%). The success of polyhouse cultivation and its economic viability depends on accessibility to market both for

inputs and produced output. Distant markets leading to higher cost of transportation, fluctuation in prices of flowers and vegetables and exploitation by middle men are the other major marketing constraints. In this context, farmers suggested that availability of raw material of required quantity at local market and promotion of direct marketing would beneficial to them.



**Table 9:** Suggestions expressed by capsicum growers in Farmer level initiatives to overcome the constraints

(n=50)				
Sl.no	Suggestions	Number	Per cent	Rank
<b>Farmer level initiatives</b>				
1	Cluster and cooperative based approach in production and marketing of produce	42	84.00	I
2	Appropriate selection of site and location of polyhouse installation	40	80.00	II
3	Installation of rain water harvesting technique to reduce irrigation cost	38	76.00	III
4	Reducing polyhouse instalment cost by using local material	30	60.00	IV

In case of Farmer level initiatives, suggestions as opined by growers are detailed in Table 9. Majority of the growers suggested that undergoing cluster and cooperative based approach in production and marketing of produce (84.00%), this innovative marketing approaches such as cluster and cooperative based marketing will increase the bargaining capacity of farmers thereby giving them power to fix the prices of their products in the markets. Another suggestion was, appropriate selection of site and location of polyhouse installation (80.00%) growers should take appropriate and scientific measures in selection of site and location of polyhouse cultivation and its proper management. Installation of rain water harvesting technique to reduce irrigation cost (76.00%) and reducing polyhouse instalment cost by using local material (60.00%) are the other suggestions expressed by the horticulture crop growers to overcome the problems.

### Conclusion

High initial investment, lack of availability of quality planting materials and inputs, poor post-harvest infrastructure and absence of price policy have led to very limited adoption of this technology by few farmers in certain pockets of the country. Favourable policy measures such as expanding the scope and amount of subsidy; provision of quality planting material and inputs at affordable prices; investment in infrastructure to plug post-harvest losses and pricing policy would enhance the profitability and sustainability along with increasing the adoption of this technology. Research and Development initiatives should aim at developing low cost designs and reducing the cost of erection of polyhouse and cost of cultivation. The re-inventions in design and structure of polyhouse by farmers also credit due recognition and attention of research and extension agencies. The success of adoption of this technology also depends on how well the farmers integrate this technology on their farm to suit their socio-economic and agro-ecological conditions.

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