

ROUND THE YEAR VEGETABLE PRODUCTION INSIDE LOW COST POLYHOUSE UNDER MID HILLS OF NORTH – WEST HIMALAYAS

Vinod Sharma

Department of Agronomy, Forages and Grassland Management
CSK Himachal Pradesh Krishi Vishva Vidyalaya, Palampur-176 062

Abstract: A field experiment was conducted inside low cost polyhouse at Research Farm, Department of Agricultural Engineering, CSK HPKV, Palampur situated at an elevation of 1,280 meters above mean sea level during 2000-01, 2001-02 and 2002-03. Treatments were consisted of six cropping sequences were evaluated in randomized complete block design with three replications. Crop combinations were taken by considering their offseasonality and market price. Cropping sequences (CS) were; CS₁: brinjal–cauliflower – frenchbean, CS₂: capsicum– cabbage– green onion, CS₃: tomato - cauliflower – cauliflower, CS₄: cucumber - frenchbean– frenchbean , CS₅: cucumber– tomato –cauliflower and CS₆: tomato – cabbage – spinach. The soil of the experimental field was clay loam in texture having pH 5.5, high in organic carbon (87.38%), low in available nitrogen (242kg N/ha) and phosphorus (8.6 kg p/ha) and medium in potassium (262.3 kg K/ha). Tomato, cucumber and green onion were the major determinants for yield, whereas frenchbean had the minimum yield potential. The highest production (1791.1q/ha/year) and production efficiency (4.91q/ha/ day) were recorded in the CS₂; cabbage – capsicum – green onion followed by CS₅; tomato-cucumber-cauliflower (Table 1). Whereas, cucumber - frenchbean - frenchbean (CS₄) gave the lowest cumulative yield (968.6q/ ha/year) and production efficiency (2.65 kg/q/day). Capsicum-cabbage-green onion sequence gave significantly highest net return (Rs. 22,295) over all other sequences. It was followed by Cucumber-tomato-cauliflower sequence which gave Rs.13,492 per hectare net returns. The lowest net returns Rs.8,484 per hectare were obtained in Cucumber-frenchbean-frenchbean sequence.

Keywords: Cropping sequence, polyhouse, Production potential, Profitability.

INTRODUCTION

Crop intensification through cropping sequence is not only productive and profitable but also sustainable. Moreover it entails efficient utilization of natural resources (Prasad et al. 2011). In spite of quantum improvement in the production, vegetable has been plagued by weather extreme and technological accessibility which widened the gap between availability (220g/day/person) and requirement (300g/day/person). In the era of market-driven production system, suitable cropping sequence of high value vegetables is the most important aspect to get more benefit per unit of area particularly in temperate region. North-eastern Himalayan regions are blessed with varied agro-climatic conditions which favour cultivation of varieties of vegetables. However weather extremities limit the production potential and in turn

profitability. Protected cultivation of vegetables is a vital tool to cultivate vegetables even during weather extremities. Moreover a viable cropping sequence will play significant role in making farming more profitable particularly for small and marginal farmers (Srivastava et al. 2002). In this background, the present investigation was undertaken to evaluate the performance of off-season vegetable-based cropping sequence under low-cost polyhouse to determine the best cropping sequence, to enhance the profitability of vegetables under mid hills of north-west Himalayan regions.

MATERIAL AND METHODS

A field experiment was conducted inside low cost polyhouse at Research Farm, Department of Agricultural Engineering, CSK HPKV, Palampur situated at an elevation of 1,280 meters above mean sea level during 200-01, 2001-02 and 2002-03. Treatments were consisted of six cropping sequences were evaluated in randomized complete block design with three replications. Crop combinations were taken by considering their offseasonality and market price. Cropping sequences (CS) were; CS₁: brinjal–cauliflower – frenchbean, CS₂: capsicum–cabbage– green onion, CS₃: tomato - cauliflower – cauliflower, CS₄: cucumber - frenchbean– frenchbean, CS₅: cucumber– tomato –cauliflower and CS₆: tomato – cabbage – spinach. The soil of the experimental field was clay loam in texture having pH 5.5, high in organic carbon 87.38%), low in available nitrogen (242kg N/ha) and phosphorus (8.6 kg p/ha) and medium in potassium (262.3 kg K/ha. Recommended package of practices were followed for raising the crops.

RESULTS AND DISCUSSION

Crop yield and production efficiency of cropping sequences in polyhouse (Table 1) showed significant difference. Tomato, cucumber and green onion were the major determinants for yield, whereas frenchbean had the minimum yield potential. Under polyhouse, the highest production (1791.1q/ha/year) and production efficiency (4.91q/ha/ day) were recorded in the CS₂; cabbage – capsicum – green onion followed by CS₅; tomato-cucumber-cauliflower (Table 1). Whereas, cucumber - frenchbean - frenchbean (CS₄) gave the lowest cumulative yield (968.6q/ ha/year) and production efficiency (2.65 kg/q/day). The findings on enhanced production under protected condition are in agreement with Singh et al. (2011) and Cheema et al. (2004) who recorded higher yield of vegetables under protected condition. Capsicum-cabbage-green onion sequence gave significantly highest net return (Rs. 22,295) over all other sequences (Table 2). It was followed by Cucumber-tomato-cauliflower sequence which gave Rs.13,492 per hectare net returns. The lowest net returns Rs.8,484 per hectare were

obtained in Cucumber-frenchbean-frenchbean sequence. Capsicum-cabbage-green onion sequence gave highest net return per rupee invested over all other treatments i.e. 10.52 which was followed by Cucumber-tomato-cauliflower sequence (6.25). Cucumber-frenchbean-frenchbean cropping sequence resulted in lowest benefit:cost ratio of 4.24. Higher production by capsicum-cabbage-green onion sequence is obviously the main factor responsible for higher profit. Kumar et al. (2009) also reported higher benefit: cost ratio with the cropping sequence giving higher production.

Table 1. Yield and production efficiency of vegetable-based cropping sequence inside polyhouse condition (poled data of three years)

Treatments	Yield (q/ha)			Total production (q/ha/year)	Production efficiency (q/ha/day)
C ₁	Brinjal (485.4)	Frenchbean (212.6)	Cauliflower (494.4)	1192.4	3.3
C ₂	Capsicum (348.2)	Cabbage (504.3)	Green onion (938.6)	1791.1	4.91
C ₃	Tomato (331.4)	Cauliflower (442.6)	Cauliflower (392.3)	1166.3	3.19
C ₄	Cucumber (592.7)	Frenchbean (210.3)	Frenchbean (165.6)	968.6	2.65
C ₅	Tomato (598.3)	Cucumber (588.1)	Cauliflower (339.7.)	1526.1	4.18
C ₆	Tomato (354.1)	Cabbage (441.4)	Spinach (534.2)	1329.7	3.64

Table 2. Benefit: Cost Ratio in different crop sequences.

Crop sequence	Gross Return (Rs/100m ²)	Cost of production (Rs/100m ²)	Net return (Rs/100m ²)	Benefit:Cost ratio
Brinjal-Cauliflower-Frenchbean	12435	2030	10405	4.92
Capsicum-Cabbage-Green Onion	24415	2120	22295	6.52
Tomato-Cauliflower-Cauliflower	11753	2189	9564	4.37
Cucumber-Frenchbean-Frenchbean	10482	1998	8484	4.24
Cucumber-Tomato-Cauliflower	15650	2158	13492	5.25
Tomato-Cabbage-Spinach	13507	2167	11340	5.23

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