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Studies on Yield and Economics of Winter Vegetables in North East Ghat Zone of Odisha, India

G. Mishra*, S.S. Nanda and M.D. Bairagya

Faculty of Agriculture, Gandhi Institute of Biological Science, Gunupur, Odisha, India

**Corresponding author*

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A B S T R A C T

The present study entitled "Studies on yield and economics of winter vegetables in North East Ghat Zone of Odisha" was designed to assess the comparative profitability of selected winter vegetables: namely tomato, cabbage, cauliflower, carrot and beet. The experiment was carried out on instructional farm of College of Agriculture, GIBS, Gunupur, Odisha during *pre-rabi* season 2017-18 with six treatments and ten replications treated in Randomized Block Design. The results of the study were statistically analysed and it showed significant differences between the treatments. Plant height, crop duration and cost of cultivation was found highest in tomato, whereas; the minimum values for the same were observed in beet. Fruit diameter and fruit weight were recorded maximum in cabbage and minimum in carrot. Carrot was significantly profitable followed by cabbage. Per hectare yield was more in cabbage followed by tomato whereas; gross return, net profit and tomato equivalent yield (TEY) was more in carrot. Based on the above study, it was recommended that the vegetable growers could take up the cultivation of cabbage, carrot and tomato on a commercial scale in and around Gunupur to cater the need of local as well as outside market.

Introduction

Vegetable growing is an important farming activity from farmers prospective. The vegetables not only have grate potential in improving health of people but also capable of economically empower them. It provides essential nutrients for balance diet. At global level, India is second largest producer that accounts 175 million tonnes production from 10.3 million hectare cropped land. Vegetable production in Odisha is 8760.09 MT from cultivated land of 639.34 hectare (NHB, 2016-17). Major winter vegetables grown in Odisha are solanaceous crops, cole crops and root crops. Among these tomato, cabbage, cauliflower, knolkhol, carrot, beet etc. are important from commercial point of view. Tomato being grown both in *kharif*, *rabi* and *summer* was tested with equivalent crops to assess the yield performance and economics in the present investigation.

Materials and Methods

An experiment was conducted on instructional farm of College of Agriculture, GIBS, Gunupur, Odisha during *pre-rabi* season

2017-18. The soil of the experimental site was moderately red and sandyloam texture with slightly acidic (pH = 5.98) and 0.08 dsm^{-1} EC. The available nitrogen, phosphorous and potassium content of soil were 79.5, 21.3 and 136.5 $kgha^{-1}$ respectively. The experimental site was located at 19.08^{o} N and 83.82^{o} E and has an average elevation of 118 mts in the lap of Eastern Ghat and on the bank of river Bansadhara. There were six treatments consisting of individual crops such as tomato, cabbage, cauliflower, knolkhol, carrot and beet were evaluated in Randomized Block Design each with 10 replications.

7m x 4.75m size plots were made for conducting the experiment. Utmost care was taken during the preparation of nursery beds and seed sowing of transplanted crops like cabbage, cauliflower, knolkhol and tomato. Beet and Carrot were line sown.

Recommended package and practices were followed for each crop. The crop experienced rainfall of 797.8mm and 488.5mm respectively in the month of September and October 2017. Need based irrigation was provided subsequently till harvest of the crop.

For recording various biometric observations 10 plants were taken randomly from each replication. The growth attribute such as plant height was taken at 15 days interval and yield attributes such as fruit weight, diameter were taken during harvesting.

The tomato equivalent yield (TEY) was calculated by using the following formula:

$$TEY = \frac{\text{Yield of Y crop (in kg) x Price of Y crop (Rs/kg)}}{\text{Price of Tomato (Rs/kg)}}$$

The gross return, cost of cultivation, net profit and benefit: cost ratio of different treatments were calculated on the basis of prevailing market price. Labour and power cost for different operations such as ploughing, weeding, irrigation, sowing, staking, nursery bed preparation, transplanting and harvesting etc. along with inputs such as fertilizer and seeds were considered as per market price.

Net return (ha^{-1}) = Gross return (ha^{-1}) – Cost of Cultivation (ha^{-1})

Benefit: cost ratio = Gross return (ha^{-1})/Total cost of cultivation (ha^{-1})

Data obtained from various characters of growth and yield were analyzed statistically by using "Analysis of Variance" (ANOVA) table as described by Gomez and Gomez (1976). The critical difference at 5% level of significance was calculated in terms of tomato equivalent yield.

Results and Discussion

Growth parameters

It was evident from table 1 that the duration of beet was shortest (90 days) and the highest duration was observed in tomato (125 days). The plant height was maximum in tomato (90 cm). Number of plants per hectare basis was maximum (3,00,000) in carrot as the spacing was less (30cm x10cm) in comparison to all other crops.

Yield parameters and Yield

The data presented in table 2 revealed that the highest economic yield (308.18 qha^{-1}) was recorded in cabbage. Similar result was also obtained by Akter (2011). The lowest yield (100.90 qha^{-1}) was recorded in beet. Average fruit weight (1,670gm) and fruit diameter (17.7 cm) was maximum in cabbage and minimum in carrot with corresponding values of 141 gm and 4.6 cm.

Table.1 Growth and yield parameters of different vegetables

Crops	No. of plants per ha	Plant height (cm)	Harvesting time (DAS)	Fruit weight (gm)	Fruit diameter (cm)	Crop duration (days)
Tomato	30,300	90	95	95	4.7	125
Cabbage	30,300	40	90	1,670	17.7	120
Cauliflower	30,300	45	85	1,440	14.7	115
Knolkhol	50,000	37	70	170	7.7	100
Carrot	3,00,000	37	78	141	4.6	110
Beet	2,00,000	30	60	142	5.7	90

Table.2 Yield and economics of different vegetables

Crops	Economic yield (q/ha)	Gross return (Rs/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	Tomato Equivalent Yield (q/ha)	Benefit: cost ratio
Tomato	305.45	3,05,545	61,000	2,94,560	100.80	5.00
Cabbage	308.18	4,47,939	53,000	3,94,939	147.47	8.45
Cauliflower	127.27	3,09,946	54,000	2,55,946	102.06	5.73
Knolkhol	106.06	3,70,860	51,000	3,19,860	122.50	7.27
Carrot	138.78	4,86,060	47.000	4,39,060	159.95	10.3
Beet	100.90	3,10,956	47,000	2,63,956	102.56	6.61
SEm (±)					6.02	
CD (5%)					17.13	
CV (%)					15.52	

Table.3 Nutrient status of soil before and after the crop

Crops	P^H		EC(ds/m)		O.C (%)		N (kg/ha)		P_2O_5 (kg/ha)		K_2O (kg/ha)	
	I	F	I	F	I	F	I	F	I	F	I	F
Tomato	5.7	5.8	0.05	0.09	0.20	0.27	87.3	74.8	15.2	11.2	135.7	130.2
Cabbage	6.2	5.7	0.08	0.05	0.27	0.24	71.3	53.6	19.8	17.2	144.3	126.7
Cauliflower	5.9	5.4	0.12	0.06	0.18	0.22	92.5	63.8	17.6	15.3	139.4	133.6
Knolkhol	6.0	5.9	0.09	0.15	0.34	0.38	82.7	60.2	24.6	21.7	133.8	117.5
Carrot	5.7	5.2	0.09	0.07	0.27	0.30	68.9	52.1	28.7	25.2	128.6	117.9
Beet	6.4	5.8	0.08	0.24	0.32	0.29	74.7	52.8	22.1	19.6	137.7	142.5

NB: I- Initial (before sowing), F – Final (after harvesting)

Significantly the tomato equivalent yield was highest (159.95 qha^{-1}) in carrot as the prevailing market price (Rs.35/- per kg) was more as compared to all other crops and lowest in cauliflower (102.06 qha^{-1}).

Cost and return analysis

The data pertaining to cost and net return exhibited significant difference among the treatments as shown in table 2.

The cost of cultivation per hectare of tomato was estimated highest (Rs. 61,000/-) followed by cauliflower (Rs. 54,000/-) and cabbage (Rs. 53,000/-). A number of studies (chowdhery, 1996, Hussain, 1997, Islam, 2000, Sultan, 2001, Akhter, 2006) were conducted which were related to costs and returns of different vegetables like tomato, cabbage, cauliflower etc.

The highest per hectare gross return (Rs. 4,86,060/-) and net profit (Rs. 4,39,060/-) was estimated from carrot followed by cabbage (Akter and Islam, 2011). Highest benefit: cost ratio was also estimated in carrot (10.30) followed by cabbage (8.45). A loss of 10% yield in cauliflower was due to heavy attack of Diamond Back Moth (DBM) which affected the net return. Similar result was found by Meena and Sharma (2003).

Nutrient status

In all the treatments soil nitrogen and phosphorous was depleted from initial to harvest stage as shown in table 3. Highest nitrogen depletion (28.7 $kgha^{-1}$) was in cauliflower and lowest (12.5 $kgha^{-1}$) in tomato.

Considerable amount of soil phosphorous was decreased from initial to harvest stage of crops ranging from 4 $kgha^{-1}$ in tomato to 2.3 $kgha^{-1}$ in cauliflower. The decrease in soil potassium was maximum (16.3 $kgha^{-1}$) in knolkhol.

Carrot was significantly profitable followed by cabbage. Per hectare yield was more in cabbage followed by tomato whereas; gross return and net profit was more in carrot. The vegetable growers may be recommended to take up cultivation of cabbage, carrot and tomato on a commercial scale in and around Gunupur to cater the need of local as well as outside market.

References

Akhter F (2006). Economics of some selected winter vegetables production in an area of Trishal upazila in Mymensingh district. M.S. Thesis, Department of Agricultural Economics, BAU, Mymensingh, Bangladesh.

Akter S, Islam MS (2011). An economic analysis of winter vegetables production in some selected areas of Narsingdi district, J. Bangladesh Agril. Univ. 9(2): 241–246.

Chowdhury S (1996). Growth and Instability of Area and Production of Some Selected Winter Crops in Bangladesh. M.S. Thesis, Department of Agricultural Economics, BAU, Mymensingh, Bangladesh.

Gomez KA and Gomez AA (1976). Statistical Procedures for Agricultural Research with Emphasis on Rice. Los Banos, the Philippines: International Rice Research Institute.

Horticultural Statistics at a Glance, Government of India, 2017.

Hossain MM (1997). A comparative economic analysis of some selected high yielding varieties of winter vegetables in an area of Bangladesh. M. S. Thesis, Department of Agricultural Economics, BAU, Mymensingh, Bangladesh.

Islam MR (2000). An Economic Analysis of Winter Vegetables in an Area of Mymensingh District. M.S. Thesis, Department of Agricultural Economics, BAU, Mymensingh, Bangladesh.

Meena MK and Sharma US (2003). Seasonal incidence and assessment of some microbial insecticides against diamondback moth, *Plutella xylostella* (L.) in cabbage. Journal of Applied Zoological Research, 14 (1): 61-62.

Sultana MS (2001). Economic Study on Commercially Produced Winter

Vegetables in Some selected Areas of Comilla District, M.S. Thesis, Department of Agricultural Economics, BAU, Mymensingh, Bangladesh.

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