Economic analysis of *kharif*vegetable cultivationinPalghar district of Maharashtra State, India

ABSTRACT:

Thestudy was undertaken with the specific objective to workout costs, returns and profitabilityin vegetables production of a sample of 90 vegetable cultivators of three tahsil of Palghar *viz.* Vasai, Palghar and Dahanu during 2023.Simple statistical tools such as arithmetic mean, average, percentage, ratios and frequency distribution were worked out. For working out cost of production, standard cost concepts viz., cost-A_1, cost-A_2 cost-B_1, cost-B_2, cost-C_1, cost-C_2, cost-C_3 were used.Thecost of cultivation of kharifbrinjal, okra, cowpea, tomato, cucumber, bottle gourd and bitter gourdwas Rs.130880, Rs.172317, Rs.74835, Rs.145956, Rs.166815, Rs.220387and Rs.209361for respectively.The gross returns obtained from kharifbrinjal, okra, cowpea, tomato, cucumber, bottle gourd and bitter gourd was Rs.141240, Rs.271560, Rs.77532, Rs.280280, Rs.227850, Rs.337506 and Rs.345345 respectively.The benefit-cost ratio for kharif brinjal, okra, cowpea, tomato, cucumber, bottle gourd and bitter gourd was 1.08, 1.58, 1.04, 1.92, 1.37, 1.53 and 1.65 respectively. The promising benefit-cost ratios indicate a favorable environment for vegetable farming in Palghar, suggesting that with strategic crop selection and enhanced agricultural practices, the future of vegetable cultivation in the region is likely to be both profitable and sustainable.

KEYWORDS: Economic, cost and returns, Palghar, *Kharif* vegetables.

1. INTRODUCTION:

In India, vegetable production is a cornerstone of agriculture, contributing significantly to thenutritional security, economy, and cultural heritage.Cultivation of diverse vegetable crops creates employment opportunities along the entire value chain, from farming and harvesting to processing, transportation, and marketing.China leads significantly in both area and production, commanding 23550.22 thousand hectare (40.42%) of the global vegetable area and contributing 615886.38 thousand tonnes (52.73%) of the world's total vegetable production. India follows closely, utilizing 9292.83 thousand hectares (15.95%) of the global vegetable area to produce 145120.45 thousand tonnes (12.37%) of the world's total vegetable output [1]. The Indian scenario of vegetable production across various states, Uttar Pradesh leads with 1,413.94 thousand hectares (12.50%) and a production of 34,766.65 thousand tons (16.36%). Maharashtra, contributing 1045.19 thousand hectares (9.24%) and 15236.43 thousand tons (7.17%), having sixth rank in vegetable production in India [2]. Pune district stands out with the largest area under vegetable cultivation, accounting for 24.66 per cent of the total area. Nashik follows closely with 23.97per cent [3]. Major vegetable crops include tomatoes, onions, potatoes, and various leafy greens[6][7][8][9][10].In Konkan region of Maharashtra, Palghar district is major producer of vegetable with total 6110.25 ha.area. The various vegetable grown are Chilli (228 ha), Brinjal (293 ha), Tomato (137 ha), Cucurbits

and Leafy vegetables [3]. The benefit-cost ratio for chilli, brinjal and okra cultivation in Palghar was found to be 1.66, 1.66 and 1.70 respectively indicating that this crop was profitable on the sample farm [4].The benefit-cost ratio for tomato cultivation in Nagpur was found to be 2.49 indicating that this crop was profitable on the sample farm [5].Mumbai APMC is located in Vashi, Navi Mumbai, which is closest vicinity to the Palghar district. It is the biggest agricultural market where all kinds of fruits, vegetables, and spices are traded. Due to Mumbai-Ahmedabad highway transportation of vegetable is easy. The production process involves cultivation, irrigation, pest management, and harvesting. Once harvested, the vegetables are sorted, graded, and packaged for distribution. The marketing of these vegetables involves various channels such as local markets, wholesale markets, and even export to other states and countries.Therefore,tounderstandtheeconomics of the cultivation and disposal followed bythe vegetable cultivators,thepresentinvestigationwasundertakeninPalghardistrict.Research on *kharif* vegetable crops in Palghar is vital due to the area's heavy reliance on agriculture and diverse climatic conditions. Local farmers face challenges like high labor costs and limited market access. This study can identify profitable crops, promote sustainable practices, and enhance food security by optimizing production for local needs. Additionally, the findings will offer insights for policymakers to develop effective support programs and resource allocation strategies, ultimately empowering farmers and improving their economic stability in the region.The primary objective of this study is to evaluate the costs, returns, and profitability of vegetable production in Palghar district. By systematically analyzing these factors, the research aims to provide insights that will guide farmers and policymakers in enhancing agricultural practices and decision-making.

2. MATERIALS AND METHODS:

Thestudy was undertaken with the specific objective to workout costs, returns and profitabilityin vegetables production of a sample of 90 vegetable cultivators of three tahsil of Palghar*viz.*Vasai, Palghar and Dahanu during 2023.A multistage sampling technique was used in this study for selection of vegetable cultivators. Tahsil as a primary unit, village as a secondary unit and vegetable cultivators as a final unit for the study.Palghar district was selected purposively since this district is a major producer of vegetables in the Konkan region of Maharashtra.The list of vegetable growing farmer has been collected from village Panchayat and from each village ten farmers has been selected randomly.The study was based on primary data. Data was collected from farmers by personal interviewswith the help of specially designed questionnaire.To ensure data reliability, questionnaires were prepared and discussed with research guide before data collection. A pilot study was conducted with a small group to pre-test the questionnaires, allowing for necessary adjustments. During interviews with the 90 respondents, measures to reduce bias included using neutral language and encouraging honest feedback, enhancing the validity of the collected data.

2.1 Analysis of data:

To arrive at conclusion, the data collected from the selected sample respondents will be analyzed by using simple statistical tools such as arithmetic mean, average, percentage, ratios, etc.

2.1.1 Tabular analysis

The data were arranged in suitable tables and cross tables. For working out cost of production, standard cost concepts viz., cost-A_1, cost-A_2 cost-B_1, cost-B_2, cost-C_1, cost-C_2, cost-C_3 were used.

2.1.2 Cost concepts used in analysis

To know, whether the net price received by producer is sufficient to cover the production cost or otherwise, the per quintal cost of production of various vegetables was worked by using standard cost concept followed in farm management studies.

Cost A_1: Cost 'A_1' included expenses incurred on hired labour, hired machinery, seeds, manures, chemical fertilizers, plant protection chemicals, irrigation charges, electricity charges land revenue and other ceases, repairing charges, depreciation on implements and interest on working capital

Cost A_2: 'Cost A_2' included cost 'A_1'+ rent paid for leased in land.

Cost B_1: Cost 'B_1' included cost 'A_1' + interest on fixed capital.

Cost B_2: Cost 'B_2' included cost 'B_1' + rental value of owned land and rent paid for leased in land.

Cost C_1: Cost 'C_1' included cost 'B_1' + imputed value of family labour.

Cost C_2: Cost 'C_2' included cost 'B_2' + imputed value of family labour.

Cost C_3: Cost 'C_3' included cost 'C_2' + supervision charges.

Benefit-cost ratio (B:C ratio)

To judge the profitability of vegetable production, B:C ratio worked out with the help of following formula.

$$\text{Benefit-cost ratio} = \frac{Total\ returns}{Total\ cost}$$

3. RESULTS AND DISCUSSION:

3.1 Per hectare cost of cultivation of *kharif* crops

Theper hectarecost of cultivation of different vegetables in*kharif* season of study area is presented in the Table 1.

It was observed from the Table 1 that, the total cost of cultivation (cost "C_3") for brinjal was worked out to be Rs.130880.20. Out of the total cost (C_3) the share of hired labour Rs.35846 (27.39 %), and it was maximum followed by family labour Rs.32770 (25.04 %), rental value of land was Rs.23390 (17.87 %), cost of FYM Rs.5680 (4.34 %), rent of machine labour Rs.4581 (3.5 %), phosphorus fertilizer Rs.3797 (2.90%), potash fertilizer Rs.3448 (2.63 %), nitrogen fertilizer Rs.2218 (1.69 %), cost of plant protection Rs.285 (0.22 %). It was revealed that, out of the total cost (cost C_3) at farm the working capital, cost A_1 and cost B_2 were incurred 45.62 per cent, 47.20 per cent and 65.87 per cent respectively.

In case of okra production in *kharif* season, the total cost of cultivation (cost "C_3") was estimated to be Rs.172317.20. Out of total cost (C_3) the share of rental value of land Rs.45110 (26.18 %) was maximum followed by family labour were Rs.34145 (19.82 %), hired labour Rs.33284 (19.32 %), seed Rs.17160 (9.96 %), rent of machine labour Rs.7816 (4.54 %), cost of FYM Rs.6720 (3.90 %), phosphorus fertilizer Rs.4141 (2.40 %), potash fertilizer Rs.3005 (1.74 %), nitrogen fertilizer Rs.1433 (0.83 %), cost of plant protection Rs.323 (0.19 %). It was revealed that, out of the total cost (cost C_3) the working capital, cost A_1 and cost B_2 were accounted to 42.88 per cent, 44.31 per cent and 74.09 per cent respectively.Similar results have been reported by [14]

However in case of cowpea production in *kharif* season, the total cost of cultivation (cost "C_3") was found to be Rs.74835.20 The share of hired labour Rs.23996 (32.07 %) in total cost was maximum and it was followed by family labour Rs.14965 (20.00%), rental value of land Rs.12157 (16.25 %), cost of FYM Rs.4080 (5.45 %), rent of machine labour Rs.3843 (5.14 %), cost of phosphorus fertilizer Rs.3756 (5.02 %), seed Rs.2016 (2.69 %), cost of plant protection Rs.330 (0.44 %),nitrogen fertilizer Rs.325 (0.43%). The working capital, cost A_1 and cost B_2 were incurred 51.24 per cent, 53.27 per cent and 70.91 per cent respectively in cowpea production.

It was observed from the Table 1 that, the total cost of cultivation (cost "C_3") for tomato was worked out to be Rs.145955.70. Out of the total cost (C_3) the share of rental value of land was Rs.46563 (31.90 %) and it was maximum followed by hired labour Rs.32300 (22.13 %), family labour Rs.22352 (15.31%), potash fertilizer Rs.11580 (7.93 %), rent of machine labour Rs.5911 (4.05 %), cost of FYM Rs.5763 (3.95 %), cost of plant protection Rs.1425 (0.98 %), nitrogen fertilizer Rs.1302 (0.89 %), phosphorus fertilizer Rs.1006 (0.69 %), seed Rs.600 (0.41 %). It was revealed that, out of the total cost (cost C_3) at farm the working capital, cost A_1 and cost B_2 were incurred 41.03 per cent, 60.83 per cent and 75.59 per cent respectively.

In case of cucumber production in *kharif* season the total cost of cultivation (cost "C_3") was estimated to be Rs.166815. Out of total cost (C_3) the share of cost of supporting materials Rs.59500 (35.67 %) was maximum followed by rental value of land Rs.37825 (22.67%), hired labour were Rs.16655 (9.98%), family labour Rs.11305 (6.78%), cost of FYM Rs.6320 (3.79%), rent of machine labour Rs.4358 (2.61%), seed Rs.3960 (2.37%), phosphorus fertilizer Rs.2447 (1.47%), cost of plant protection Rs.2117 (1.27%), nitrogen fertilizer Rs.1772 (1.06%), potash fertilizer Rs.1739 (1.04%). It was revealed that, out of the total cost (cost C_3) the working capital, cost A_1 and cost B_2 were accounted to 59.27 per cent, 60.83 per cent and 84.13 per cent respectively.

Similarly for the bottle gourd production in *kharif* season the total cost of cultivation (cost "C_3") was estimated to be Rs. 220387.20. Out of total cost of cultivation of bottle gourd (C_3) the share of cost of supporting materials Rs.58000 (26.32 %) and it was become maximum followed by rental value of land was Rs.56101 (25.46 %), hired labour Rs.32386 (14.70 %), family labour Rs. 19643(8.69 %), rent of machine labour Rs.9794 (4.44 %), seed Rs.6000 (2.72 %), cost of FYM Rs.5240 (2.38 %), phosphorus fertilizer Rs.3666 (1.66 %), potash fertilizer Rs.2233 (1.01 %), cost of plant protection Rs.2052 (0.93 %), nitrogen fertilizer Rs.1296 (0.59%). It can be seen that, out of the total cost (cost C_3) the working capital, cost A_1 and cost B_2 were accounted to 54.75 per cent, 56.29 per cent and 82.22 per cent respectively.

It was observed from the Table 1 that, the total cost of cultivation (cost "C_3") for bitter gourd was worked out to be Rs.209360.80. Out of the total cost (C_3) the share of rental value of land was Rs.57408 (27.42%) and it was maximum followed by cost of supporting materials Rs.55000 (26.27%), hired labour Rs.26053 (12.44%), family labour Rs.24252 (11.58%),cost of FYM Rs.5910 (2.82%), phosphorus fertilizer Rs.4259 (2.03%), cost of plant protection Rs.1819 (0.87%), potash fertilizer Rs.1619 (0.77%), seed Rs.1530 (0.73%), nitrogen fertilizer Rs.1505 (0.72%). It was revealed that, out of the total cost (cost C_3) at farm the working capital, cost A_1 and cost B_2 were incurred 49.44 per cent, 51.41 per cent and 79.33 per cent respectively.

Table 1. Per hectare cost of cultivation for *kharif* crops

Sr. No.	Particulars	Brinjal	Okra	Cowpea	Tomato	Cucumber	Bottle gourd	Bitter gourd
1	Hired human labour							
	Male	19508 (14.91)	17632 (10.23)	13479 (18.01)	17108 (11.72)	9563 (5.73)	18768 (8.52)	14373 (6.87)
	Female	16338	15653	10517	15192	7092	13618	11680

		(12.48)	(9.08)	(14.05)	(10.41)	(4.25)	(6.18)	(5.58)
	Sub total	35846 (27.39)	33284 (19.32)	23996 (32.07)	32300 (22.13)	16655 (9.98)	32386 (14.70)	26053 (12.44)
2	Machine	4581 (3.5)	7816 (4.54)	3843 (5.14)	5911 (4.05)	4358 (2.61)	9794 (4.44)	5822 (2.78)
3	Manure	5680 (4.34)	6720 (3.9)	4080 (5.45)	5763 (3.95)	6320 (3.79)	5240 (2.38)	5910 (2.82)
4	Fertilizer							
	Urea	2218 (1.69)	1433 (0.83)	325 (0.43)	1302 (0.89)	1772 (1.06)	1296 (0.59)	1505 (0.72)
	SSP	3797 (2.9)	4141 (2.4)	3756 (5.02)	1006 (0.69)	2447 (1.47)	3666 (1.66)	4259 (2.03)
	MOP	3448 (2.63)	3005 (1.74)	0	11580 (7.93)	1739 (1.04)	2233 (1.01)	1619 (0.77)
	Sub total	9463 (7.23)	8578 (4.98)	4081 (5.45)	13888 (9.52)	5958 (3.57)	7195 (3.26))	7382 (3.53)
5	Seed	3850 (2.94)	17160 (9.96)	2016 (2.69)	600 (0.41)	3960 (2.37)	6000 (2.72)	1530 (0.73)
6	Supporting materials	0	0	0	0	59500 (35.67)	58000 (26.32)	55000 (26.27)
7	Plant protection chemical	285 (0.22)	323 (0.19)	330 (0.44)	1425 (0.98)	2117 (1.27)	2052 (0.93)	1819 (0.87)
8	Working Capital	59705 (45.62)	73881 (42.88)	38346 (51.24)	59887 (41.03)	98868 (59.27)	120667 (54.75)	103516 (49.44)
9	Interest on working Capital	1194 (0.91)	1478 (0.86)	575 (0.77)	1797 (1.23)	1483 (0.89)	2413 (1.09)	3105 (1.48)
10	Land rev. Cess and other taxes	150 (0.11)	150 (0.09)	150 (0.2)	150 (0.1)	150 (0.09)	150 (0.07)	150 (0.07)
11	Depreciation	731 (0.56)	846 (0.49)	797 (1.07)	896 (0.61)	977 (0.59)	836 (0.38)	855 (0.41)
	A_1	61780 (47.2)	76355 (44.31)	39868 (53.27)	62730 (42.98)	101478 (60.83)	124066 (56.29)	107626 (51.41)
10	Rental value of leased land	0	0	0	0	0	0	0
	A_2	61780 (47.2)	76355 (44.31)	39868 (53.27)	62730 (42.98)	101478 (60.83)	124066 (56.29)	107626 (51.41)
10	Int. On fix. Cap.@ 10 %/annum	1042 (0.8)	1042 (0.6)	1042 (1.39)	1042 (0.71)	1042 (0.62)	1042 (0.47)	1042 (0.5)
	B_1	62822 (48)	77397 (44.92)	40910 (54.67)	63772 (43.69)	102520 (61.46)	125108 (56.77)	108668 (51.9)
	Rental value of land(1/6 th-land revenue)	23390 (17.87)	45110 (26.18)	12157 (16.25)	46563 (31.9)	37825 (22.67)	56101 (25.46)	57408 (27.42)
	B_2	86212 (65.87)	122507 (71.09)	53067 (70.91)	110335 (75.59)	140345 (84.13)	181209 (82.22)	166076 (79.33)
13	Family human labour							
	Male	18040 (13.78)	18816 (10.92)	6773 (9.05)	12216 (8.37)	5415 (3.25)	9026 (4.1)	13168 (6.29)
	Female	14730	15329	8192	10136	5890	10118	11084

		(11.25)	(8.9)	(10.95)	(6.94)	(3.53)	(4.59)	(5.29)
	Total	32770 (25.04)	34145 (19.82)	14965 (20)	22352 (15.31)	11305 (6.78)	19143 (8.69)	24252 (11.58)
	C_1	95592 (73.04)	111542 (64.73)	55875 (74.66)	86124 (59.01)	113825 (68.23)	144251 (65.45)	132920 (63.49)
	C_2	118982 (90.91)	156652 (90.91)	68032 (90.91)	132687 (90.91)	151650 (90.91)	200352 (90.91)	190328 (90.91)
	Supervision charges @10% of C_2	11898.2 (9.09)	15665.2 (9.09)	6803.2 (9.09)	13268.7 (9.09)	15165 (9.09)	20035.2 (9.09)	19032.8 (9.09)
10	C_3	130880.2 (100)	172317.2 (100)	74835.2 (100)	145955.7 (100)	166815 (100)	220387.2 (100)	209360.8 (100)

(Figures in parentheses indicate percentage to total)

3.2 Perhectareprofitabilityof*kharif* vegetable crops

Theperhectareprofitability of vegetables crop of *kharif* season in the study area was estimated and presented in Table 2.

It was revealed from the Table 2 that, the per hectare average production of brinjal was observed to be 47.08 q, and the price realized by producer for brinjal was ₹.3000/q. Therefore, the per hectare gross return obtained by producer from brinjal was estimated to ₹.141240. The per hectare cost A_1, cost B_1 and cost C_1 in brinjal cultivation were estimated to Rs.61780, Rs.62822, Rs.95592 and Rs.130880 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs.79460, Rs.78418, Rs.45648 and Rs.10360 respectively. However, the per quintal cost of brinjal cultivation was worked out to be Rs.2780. and the benefit-cost ratio were estimated to 1.08. This indicated that, brinjal production was profitable in study area during *kharif* season. Similar results have been reported by [15]

It was revealed from the Table 2 that, the per hectare average production of okra was observed to be 90.52 q, and the price realized by producer for okra was ₹.3000/q. Therefore, the per hectare gross return obtained by producer from okra was estimated to ₹.271560. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in okra cultivation were estimated to Rs. 76355, Rs.77397, Rs. 111542 and Rs.172317 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs.195205, Rs.194163, Rs.160018 and Rs. 99243 respectively. However, the per quintal cost of okra cultivation was worked out to be Rs.1904. and the benefit-cost ratio were estimated to 1.58. This indicated that, okra production was profitable in study area during *kharif* season.Similar results have been reported by [12]

The per hectare average production of cowpea was observed to be 18.46 q, and the price realized by producer for cowpea was ₹.4200/q. Therefore, the per hectare gross return obtained by producer from cowpea was estimated to ₹.77532. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in cowpea cultivation were estimated to Rs.39868, Rs.40910, Rs.55875 and Rs.74835 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs.37664, Rs.36622, Rs.21657 and Rs.2697 respectively. However, the per quintal cost of cowpea cultivation was worked out to be Rs.4054. and the benefit-cost ratio were estimated to 1.03, indicated that, cowpea production was profitable during *kharif* season.Similar results have been reported by [11]

It was revealed from the Table 2 that, the per hectare average production of tomato was observed to be 127.4 q, and the price realized by producer for tomato was ₹.2200/q. Therefore, the per hectare gross return obtained by producer from tomato was estimated to ₹.280280. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in tomato cultivation were estimated to Rs.62730, Rs.63772, Rs.86124 and Rs.145956 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs.217550, Rs.216508, Rs.194156 and Rs.134324 respectively. However, the per quintal cost of tomato cultivation was worked out to be Rs.1146. and the benefit-cost ratio were estimated to 1.92, indicated that, tomato production was profitable in study area during *kharif* season.Similar results have been reported by [15]

The per hectare average production of cucumber was observed to be 75.95 q, and the price realized by producer for cucumber was ₹.3000/q. Therefore, the per hectare gross return obtained by producer from cucumber was estimated to ₹.227850. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in cucumber cultivation were estimated to Rs.101477, Rs.102520, Rs.113825 and Rs.166815 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs.126373, Rs.125330, Rs.114025 and Rs.61035 respectively. However, the per quintal cost of cucumber cultivation was worked out to be Rs.2196. and the benefit-cost ratio were estimated to 1.37. Similar results have been reported by [13]

The per hectare average production of bottle gourd was observed to be 153.41 q, and the price realized by producer for bottle gourd was ₹.2200/q. Therefore, the per hectare gross return obtained by producer from bottle gourd was estimated to ₹.337506. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in bottle gourd cultivation were

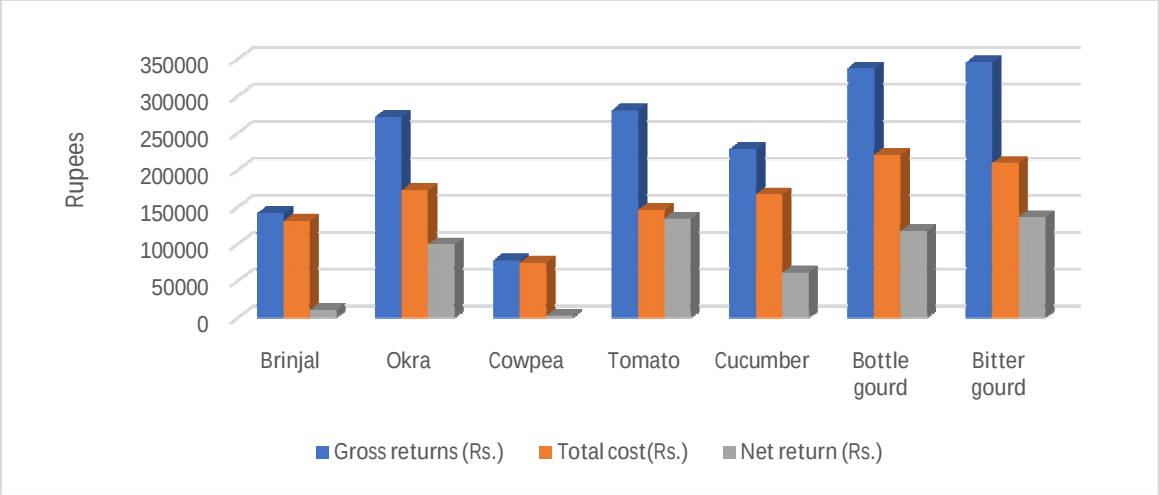
estimated to Rs.124066, Rs.125108, Rs.144251 and Rs.220387 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs. 213440, Rs. 212398, Rs. 193255 and Rs. 117119 respectively. However, the per quintal cost of bottle gourd cultivation was worked out to be Rs.1437. and the benefit-cost ratio were estimated to 1.53.

The per hectare average production of bitter gourd was observed to be 98.67 q, and the price realized by producer for bitter gourd was ₹ .3500/q. Therefore, the per hectare gross return obtained by producer from bitter gourd was estimated to ₹ .345345. The per hectare cost A_1, cost B_1, cost C_1 and cost C_3 in bitter gourd cultivation were estimated to Rs.107626, Rs.108668, Rs.132920 and Rs.209361 respectively, consequently net returns at cost A_1, cost B_1, cost C_1 and cost C_3 was accounted to Rs. 237719, Rs. 236677, Rs. 212425 and Rs. 1 respectively. However, the per quintal cost of bitter gourd cultivation was worked out to be Rs.2122. and the benefit-cost ratio were estimated to 1.65. This indicated that, bitter gourd production was profitable in study area during *kharif* season.Similar results have been reported by [16]

Table 2. Perhectareprofitabilityof*kharif* vegetable

Sr. No.	Items	Brinjal	Okra	Cowpea	Tomato	Cucumber	Bottle gourd	Bitter gourd
1	Production (qtl)	47.08	90.52	18.46	127.4	75.95	153.41	98.67
2	Price received (Rs/qtl)	3000	3000	4200	2200	3000	2200	3500
3	**Gross returns (Rs/qtl)**	**141240**	**271560**	**77532**	**280280**	**227850**	**337506**	**345345**
4	Cost (Rs)							
	COST A_1	61780	76355	39868	62730	101477	124066	107626
	COST B_1	62822	77397	40910	63772	102520	125108	108668
	COST C_1	95592	111542	55875	86124	113825	144251	132920
	COST C_3	130880	172317	74835	145956	166815	220387	209361
5	Net returns							
	COST A_1	79460	195205	37664	217550	126373	213440	237719
	COST B_1	78418	194163	36622	216508	125330	212398	236677
	COST C_1	45648	160018	21657	194156	114025	193255	212425
	COST C_3	10360	99243	2697	134324	61035	117119	135984
6	Per quintal cost of cultivation (Rs)	2780	1904	4054	1146	2196	1437	2122
7	**BC ratio**	**1.08**	**1.58**	**1.04**	**1.92**	**1.37**	**1.53**	**1.65**

Fig.1 Per hectare cost and returns of *kharif* crops



Analyzing the cost of cultivation for *kharif* vegetables reveals that brinjal and tomato incur high costs primarily due to labor and land rental expenses. Farmers may benefit from strategies that reduce these costs, such as adopting mechanization for labor-intensive tasks. Additionally, understanding the cost structure can help policymakers design targeted interventions to support farmers facing high land rental prices, ultimately leading to more sustainable agricultural practices in Palghar. The analysis reveals that certain crops, particularly tomato and bottle gourd, exhibit high gross returns and benefit-cost ratios, suggesting they should be prioritized for cultivation in Palghar to maximize profitability. In contrast, crops like cowpea, with a benefit-cost ratio just above 1, indicate relatively low net returns, prompting farmers to reassess the allocation of resources such as land and labor to more profitable options. Additionally, the significant impact of labor and land rental costs on profitability highlights the need for efficient labor practices or mechanization to enhance net returns, particularly in brinjal production. These insights can inform policymakers in developing targeted support programs, including subsidies and training for farmers on best practices for high-yield crops.

4. CONCLUSION:

The cost of cultivation (cost "C_3") for *kharif* vegetables was worked out to be Rs., Rs.130880.2, Rs.172317.2, Rs.74835.2, Rs.145956, Rs.166815, Rs.220387.2 and Rs.229361 for brinjal, okra, cowpea, tomato, cucumber, bottle gourd and bitter gourd respectively.The analysis of per hectare profitability of *kharif* vegetables indicated that brinjal, okra, cowpea, tomato, cucumber, bottle gourd and bitter gourd cultivation was profitable at all the levels of cost, resulting benefit-cost ratio of 1.08, 1.58, 1.03, 1.92, 1.37, 1.53 and 1.65 respectively.

5. POLICY IMPLICATIONS:

- Though the vegetables are grown commercially in the study area, the farmers were facing problem regarding technical knowledge about, fertilizer doses,

pest and disease management, and proper vegetable varieties. Therefore, it is recommended that, government should organize regular training training programmes regarding updatation of technical knowledge of farmer and new varieties of vegetables recommended for the region.

- The vegetables are very perishable in nature the productivity, is adversely affected by climate change in the study area. However, infrastructure of transport also very poor in the study area; Therefore, it is recommended that to increase the productivity of vegetables there is need to developed road infrastructure and climate smart research for different vegetable varieties.

DISCLAIMER (ARTIFICIAL INTELLIGENCE):

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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