RESEARCH PAPER

An economic analysis of production and marketing of cauliflower in Bilaspur district of Chhattisgarh State

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Abstract : The study was conducted in Bilaspur district of Chhattisgarh in the year 2014-15 to analyse the production and marketing of cauliflower with a sample size of 154 farmers and 30 intermediaries from 4 blocks of the district. The study found on an average cost of cultivation of cauliflower Rs. 50573.84 per ha. The lowest cost of cultivation was observed at small farm as Rs. 48964.52 per ha while highest at large farm as Rs. 52104.68 per ha. Hired human labour cost maximum share as 20.18 per cent to total cost of cultivation. Cost A_1 was observed Rs. 21653.84 per ha. The net return on Cost A_1 was Rs. 1169.06 per q and Rs. 154100.06 per ha. The overall B:C ratio was estimated 3.48 for cauliflower production, minimum at marginal farm *i.e.* 3.26 and maximum at medium farm as 3.75. There were two marketing channels identified Channel I: Producer to Consumer and Channel II: Producer to Commission agents/retailers to consumer. The channel I was found most efficient as 39.85 per cent as compare to channel II *i.e.* 14.52 per cent. Monkey's nuisance was appeared as most common problem in study area.

Key Words : Economic analysis, Production, Marketing, Cauliflower

INTRODUCTION

Chhattisgarh is popularly known for rice production as larger area comes under paddy cultivation. Hence, the State is known as the rice bowl. Apart from paddy, vegetables are also grown. Vegetable is now much recognized and understood by agricultural community due to its wide range of utility. It has been observed that economic returns to vegetable growers are better than other several crops. In the State, during 2010-11 vegetables occupied an area of 0.346 million hectares

with the production 4.25 million metric tonnes which accounted 4.1 and 2.9 per cent over the national figures, respectively. The productivity of State 12.3 metric tonnes is quite less than the national average *i.e.* 17.3 metric tonnes. More or less all the districts of the State produce vegetables, most prominent areas are of tomato, potato, brinjal, okra, cauliflower, cabbage, cowpea and onion in the State. Bilaspur district shared 20.41 per cent area and 16.32 per cent production of vegetables to the total area and production in the State. Cauliflower is one of the popular vegetable in Bilaspur district. To know the

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economics in production and marketing of this crop this study was under taken with the following objectives.

Objectives:

– To examine the cost and return of cauliflower production of selected households.

– To find out the marketing pattern of cauliflower in the study area.

– To identify major constraints in production and marketing of cauliflower and to suggest suitable measures to overcome them.

MATERIAL AND METHODS

The details of the method and techniques for the study are described as below:

The study was conducted in Bilaspur district of Chhattisgarh State, out of 7 blocks 04 blocks were selected purposively for the study and from each block, fifteen per cent villages to total number of cauliflower growing villages were selected keeping the criterion of highest area under the crop.

The farmer grows vegetables commercially were considered as a cauliflower growing farmer. The study considered a classified farmers categories *viz.,* marginal (<1), small (1<2 ha) medium (2<4 ha) and large (> 4 ha). A 10 per cent respondent was selected at random with the sample size of 154 farmers

Primary data was collected through personal interview method with the help of pre-tested questionnaires and schedule with selected vegetable growers. Secondary data were also collected though scan from different district, block and village level official records.

A 10 per cent intermediary was selected at random with the sample size 30 from the market.

The detail enquiry was done for the agricultural year 2014-15.

Analytical procedure :

To work out the cost of cultivation simple arithmetic and statistics and statistical techniques of analysis *viz.,* average, percentage were used and cost of production worked out as per the definition given by Commission on Agricultural Costs and Prices (CACP) that are as follows:

– Cost A1 = Value of purchased material inputs (seed, insecticides and pesticides, manure, fertilizer), hired human labour, animal labour (hired and owned), hired farm machinery, depreciation on farm implements and farm buildings, irrigation charges, land revenue cesses and other taxes, and interest on working capital.

– Cost A2 = Cost A1 + rent paid for leased-in land.

– Cost B1= Cost A1+ interest on value of owned capital assets (excluding land).

– Cost B2 = Cost B1+ rental value of owned land (net of land revenue) and rent paid for leased-in land.

– Cost C1 = Cost B1 + Imputed value of family labour.

– Cost C2 = Cost B2 + Imputed value of family labour.

– Cost C3 = Cost C2+ 10% of Cost C2 on account of managerial functions performed by farmer.

Marketing cost, margins and price spread:

$$C= C_f + C_{m1} + C_{m2} + C_{m3} + ...C_{mn}$$

where, C =Total cost of marketing of the commodity

C_f = Cost paid by the producers from the time producer leaves the farm till he sells it, and

C_{mi} = Cost incurred by the ith middleman in the process of buying and selling the product.

Gross margin:

$$M= S_i - P_i$$

where, M = Gross margin

S_i = Sale value of produce for i^{th} middleman

P_i = Purchase value for i^{th} middleman

i = Type of ith middleman.

Net margin of market intermediaries:

$$N_{mi} = P_{ri} - (P_{pi} + C_{mi})$$

where, N_{mi} = Net margin of ith type of market middleman

P_{ri} = Total value of receipts per unit (Sale)

P_{pi} = Per unit purchase price of goods by the ith middleman

C_{mi} = Per unit marketing cost incurred by the ith middleman.

Producer's price:

$$P_F = P_A - C_F$$

where, P_F = Net price received by farmer

P_A = Wholesale price

C_F = The marketing cost incurred by the farmer.

Producer's share in consumer rupee:

$$P_S = (P_F / P_R) 100$$

where, P_S = Producers share in consumer rupee
P_F = Net price received by farmer
P_R = Price paid by the consumer.

Marketing efficiency:

ME = (V/I) – 1 * 100
where, ME= Index of marketing efficiency
V= Value of the goods sold or price paid by the consumer
I = Total marketing cost or input of marketing.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Economics of cauliflower :

Table 1 shows that an overall average total cost for cultivation of cauliflower in one hectare accounted to be Rs. 50573.84/ha. The expenditure on hired labour proportioned higher as 20.18 per cent to the total cost followed by family labour and machine power with 19.00 per cent and 9.36 per cent, respectively.

The cost of cultivation found on different size of farms as cost turned out to be Rs. 50124.29/ha, Rs. 48964.52/ha, Rs. 51101.87/ha and Rs. 52104.68/ha on marginal, small, medium and large size farms, respectively. The expenditure on family labour mounted maximum as 34.74 per cent and 33.45 per cent on small and marginal farms, respectively. While expenditure on hired labour amounted maximum as 36.54 per cent and 33.92 per cent followed by machine power 12.15 per cent and 12.04 per cent on large and medium size farms, respectively. The expenses on manure and fertlizer ranged from 8.58 to 9.81 per cent on sampled farms.

Table 2 revels that the average cost of cultivation of cauliflower in different size group of farmers as Cost

Sr. No.	Particulars		Marginal	Small	Medium	Large	Overall average
Table 1: Cost of cultivation of cauliflower on different size group of farms							**(Rs./ha)**
			Category of vegetable growers				
A.	**Labour cost**						
	(i)	Family labour	16765.32 (33.45)	17008.01 (34.74)	3131.77 (6.13)	1537.96 (2.95)	9610.77 (19.00)
	(ii)	Hired labour	2374.63 (4.74)	2069.31 (4.23)	17334.27 (33.92)	19039.26 (36.54)	10204.37 (20.18)
	(iii)	Bullock labour	4663.59 (9.30)	1242.51 (2.54)	0.00 (0.00)	0.00 (0.00)	1476.53 (2.92)
	(iv)	Machine power	1655.64 (3.30)	4795.27 (9.79)	6151.70 (12.04)	6329.38 (12.15)	4733.00 (9.36)
		Total Labour cost	25459.18 (50.79)	25115.10 (51.29)	26617.75 (52.09)	26906.60 (51.64)	26024.66 (51.46)
B.	**Material cost**						
	(i)	Seed	3089.27 (6.16)	3696.77 (7.55)	3858.79 (7.55)	4144.97 (7.96)	3697.45 (7.31)
	(ii)	Manure and fertilizer	4671.11 (9.32)	4600.54 (9.40)	5015.13 (9.81)	4472.35 (8.58)	4689.78 (9.27)
	(iii)	Plant protection	1467.97 (2.93)	1360.81 (2.78)	1466.53 (2.87)	1422.72 (2.73)	1429.51 (2.83)
	(iv)	Irrigation	940.35 (1.88)	938.60 (1.92)	988.00 (1.93)	972.56 (1.87)	959.88 (1.90)
		Total material cost	10168.70 (20.29)	10596.71 (21.64)	11328.45 (22.17)	11012.60 (21.14)	10776.62 (21.31)
C.	**Total working cost (A+B)**		35627.88 (71.08)	35711.81 (72.93)	37946.19 (74.26)	37919.20 (72.78)	36801.27 (72.77)
D.	**Other costs**						
	(i)	Depreciation	210.50 (0.42)	109.50 (0.22)	315.27 (0.62)	335.99 (0.64)	242.82 (0.48)
	(ii)	Interest on working capital	2066.42 (4.12)	2071.28 (4.23)	2200.88 (4.31)	2199.31 (4.22)	2134.47 (4.22)
	(iii)	Land revenue	12.00 (0.02)	12.00 (0.02)	12.00 (0.02)	12.00 (0.02)	12.00 (0.02)
	(iv)	Rent paid for leased in land	71.42 (0.14)	154.36 (0.32)	162.47 (0.32)	107.66 (0.21)	123.98 (0.25)
	(v)	Rental value of land	7384.53 (14.73)	6199.01 (12.66)	5564.19 (10.89)	6538.49 (12.55)	6421.55 (12.70)
	(vi)	Interest on value of own capital	194.79 (0.39)	255.24 (0.52)	255.24 (0.50)	255.24 (0.49)	240.13 (0.47)
		Total cost	9939.66 (19.83)	8801.39 (17.98)	8510.06 (16.65)	9448.69 (18.13)	9174.95 (18.14)
E.	Total cost (C+D)		45567.54 (90.91)	44513.20 (90.91)	46456.25 (90.91)	47367.89 (90.91)	45976.22 (90.91)
F.	Managerial cost		4556.75 (9.09)	4451.32 (9.09)	4645.62 (9.09)	4736.79 (9.09)	4597.62 (9.09)
G.	Grand total (E+F)		50124.29 (100.00)	48964.52 (100.00)	51101.87 (100.00)	52104.68 (100.00)	50573.84 (100.00)

Note- Figures in parentheses show per cent to the total

A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3 turned to be Rs. 21653.84/ha, Rs. 21777.82/ha, Rs. 21893.97/ha, Rs. 28439.50/ha, Rs. 39430.69/ha Rs. 45976.22/ha and Rs. 50573.84/ha, respectively. The higher the Cost A1 found as Rs. 23140.07/ha and lower as Rs. 20896.58/ha on medium and small farms, respectively. The Cost A2 occurred in same pattern as higher on medium *i.e.* Rs. 23302.54/ha and lower on small farm as Rs. 21050.94/ha Cost C3 was obtained higher as Rs. 52104.68/ha and lower as Rs. 48964.52/

ha on large and small farm, respectively.

Table 3 reveals an overall average cost of production as per cost concept *i.e.* Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3 which were turned out to be Rs. 164.27/q, Rs.165.21/q, Rs. 166.10/q, Rs. 215.75/q, Rs. 299.13/q, Rs. 348.79/q and Rs. 383.67/q, respectively. The net returns over the respective costs were observed as Rs. 1169.06/q, Rs. 1168.12/q, Rs. 1167.23/q, Rs. 1117.58/q, Rs. 1034.20/q, Rs. 984.54 /q and Rs. 949.66/q. The marginal farm spent maximum

Table 2 : Break-up of cost of cultivation of cauliflower on different size group of farms (Rs./ha)

Sr. No.	Particulars	Marginal	Small	Medium	Large	Overall average
1.	Cost A1	21151.48	20896.58	23140.07	21427.24	21653.84
2.	Cost A2	21222.90	21050.94	23302.54	21534.90	21777.82
3.	Cost B1	21346.28	21151.82	23395.31	21682.48	21893.97
4.	Cost B2	28802.22	27505.19	29121.98	28328.63	28439.50
5.	Cost C1	38111.60	38159.83	40729.59	40721.74	39430.69
6.	Cost C2	45567.54	44513.20	46456.25	47367.89	45976.22
7.	Cost C3	50124.30	48964.52	51101.87	52104.68	50573.84

Table 3: Economics of production of cauliflower on selected households

Sr. No.	Particulars	Marginal	Small	Medium	Large	Overall average
1.	**Cost of production Rs./q**					
	Cost A1	172.78	164.38	161.00	159.91	164.27
	Cost A2	173.37	165.60	162.13	160.71	165.21
	Cost B1	174.37	166.39	162.78	161.81	166.10
	Cost B2	235.28	216.37	202.62	211.41	215.75
	Cost C1	311.33	300.18	283.38	303.90	299.13
	Cost C2	372.23	350.16	323.23	353.50	348.79
	Cost C3	409.46	385.18	355.55	388.85	383.67
2.	**Net return Rs./q**					
	Cost A1	1160.55	1168.95	1172.33	1173.42	1169.06
	Cost A2	1159.96	1167.73	1171.20	1172.62	1168.12
	Cost B1	1158.96	1166.94	1170.55	1171.52	1167.23
	Cost B2	1098.05	1116.96	1130.71	1121.92	1117.58
	Cost C1	1022.00	1033.15	1049.95	1029.43	1034.20
	Cost C2	961.10	983.17	1010.10	979.83	984.54
	Cost C3	923.87	948.15	977.78	944.48	949.66
3.	**Net return Rs./ha**					
	Cost A1	142070.55	148599.88	168494.17	157235.65	154100.06
	Cost A2	141999.13	148445.52	168331.70	157127.99	153976.08
	Cost B1	141875.76	148344.64	168238.93	156980.41	153859.93
	Cost B2	134419.81	141991.27	162512.26	150334.26	147314.40
	Cost C1	125110.44	131336.64	150904.65	137941.15	136323.22
	Cost C2	117654.49	124983.26	145177.99	131295.00	129777.68
	Cost C3	113097.74	120531.94	140532.36	126558.21	125180.06

as Cost A1 with Rs. 172.78/q and minimum by large farm as Rs. 159.91/q net return was maximum fetched by large farm and minimum by marginal farm as Rs. 1173.42/q and Rs. 1160.55/q, respectively. While, Cost C3 was maximum on marginal farm and minimum on medium as Rs. 409.46/q and Rs. 355.55/q while net return on Cost C3 found on medium farm high as Rs. 977.78/q and minimum on marginal farm as Rs. 923.87 /q.

Table 4 shows that an overall average net return, family labour income, farm business income of cauliflower farm as Rs. 125180.06/ha, Rs.153976.08/ha and Rs. 147314.40/ha, respectively. The overall input-output ratio was observed 1:3.48. Medium farm gained maximum net income as Rs.140532.36/ha while minimum observed on marginal farm as Rs. 113097.74/ha with an input-output ratio 1:3.75 and 1:3.26, respectively.

Marketing channel of cauliflower:

There two marketing channels were identified in the marketing of cauliflower in the study area as.

Channel I: Producer - Consumer
Channel II: Producer – Commission agent/ Retailer-Consumer.

Table 5 depicts that marketing channel- I was more

efficient as estimated to be 39.85 against channel – II as 14.52.

Constraints in production and marketing of cauliflower and suggestions:

Table 6 displayed the constraints to the production and marketing of vegetables in Bilaspur. The study recorded the frequencies of constraints faced by vegetable growers in study area. Monkey's nuisance was appeared to be the most common problem in study area as frequency recorded 100 per cent.

The constraints ranged between 90 to < 100 per cent were (1) Inadequate follow-up services (2) Lack of soil testing facilities (3) High cost of technology (4) Poor economic condition of farmers.

The constraints ranged between 80 to < 90 per cent were (1) Deficiency in technical know how (2) Lack of sufficient number of processing unit (3) lack of post harvest technology (4) complicated procedure to avail loans (5) Inadequate demonstration of new technology (6) Low price paid to farmers due to high marketing margin. (7) Non-availability of production inputs timely (8) Inadequate training of farmers (9) Inadequate cold chain transport facility (10) Lack of location specific

Sr. No.	Particulars	Marginal	Small	Medium	Large	Overall average
				Farm size		
1.	Cost C3 (Rs.)	50124.30	48964.52	51101.87	52104.68	50573.84
2.	Yield (q)	122.42	127.12	143.73	134.00	131.82
3.	Average price received	1333.33	1333.33	1333.33	1333.33	1333.33
4.	Output value	163222.03	169496.47	191634.24	178662.89	175753.91
5.	Net Income	113097.74	120531.94	140532.36	126558.21	125180.06
8.	Input-output ratio	1: 3.26	1: 3.46	1: 3.75	1: 3.43	1: 3.48

Table 4 : Cost and return of cauliflower on the sampled farms (Rs./ha)

Table 5 : Marketing cost, margin and price spread of cauliflower on different size group of farms (Rs./ q)

Sr. No.	Particulars	Marketing channel - I Average	Marketing channel - II Average
1.	**Farmer**		
	Farmer's price	1997.47 (97.63)	1158.86 (41.13)
	Marketing cost	50.08 (2.45)	174.47 (6.19)
2.	**Commission agent /Retailer**		
	Marketing cost	0.00 (0.00)	7.08 (0.25)
	Marketing margin	0.00 (0.00)	1477.01 (52.42)
3.	**Consumer**		
	Consumer price	2045.925 (100.00)	2817.42 (100.00)
	Marketing efficiency	39.85	14.52

Note: Figures in parentheses indicate percentage to total.

Table 6: Constraints to production and marketing of cauliflower on selected households

Sr. No.	Constraints		Frequency	Per cent	Rank
1.	**Social constraints in production**				
	(i)	lack of community awareness	23	14.89	xxi
	(ii)	Traditional norms of farmers	10	6.38	xxiv
	(iii)	Adverse socio-political interference	0	0.00	xxv
	(iv)	Lack of coordination of farmers	0	0.00	xxv
2.	**Organisational constraints**				
	(i)	Poor coordination and cooperation among grass root level extension worker	79	51.06	xix
	(ii)	Low credibility of extension worker	75	48.94	xx
	(iii)	Lack of timely advice and guidance by extension personnel	121	78.72	viii
	(iv)	Non availability of production inputs timely	128	82.98	vi
	(v)	Lack of effective supervision	111	72.34	xi
3.	**Constraints in technology transfer**				
	(i)	Inadequate training of farmers	128	82.98	vi
	(ii)	Inadequate demonstration of new technology	131	85.11	v
	(iii)	Inadequate follow-up services	147	95.74	ii
	(iv)	Lack of location specific recommendation	125	80.85	vii
	(v)	Deficiency in technical know how	138	89.36	iii
	(vi)	Lack of soil testing facilities	147	95.74	ii
	(vii)	Inadequate availability of mass media sources of information	111	72.34	xi
	(viii)	Lack of land consolidation	20	12.77	xxii
	(ix)	lack of post harvest technology	134	87.23	iv
4.	**Economic constraints**				
	(i)	High cost of technology	147	95.74	ii
	(ii)	Poor economic condition of farmers	147	95.74	ii
	(iii)	Non- availability of agricultural credit	111	72.34	xi
	(iv)	complicated procedure to avail loans	134	87.23	iv
	(v)	Low risk bearing capacity	105	68.09	xiii
	(vi)	Poor transportation	98	63.83	xv
	(vii)	Poor marketing facility	92	59.57	xvi
	(viii)	Absence of storage facility	121	78.72	viii
	(ix)	Low price paid to farmers due to high marketing margin.	131	85.11	v
	(x)	Lack of support price	92	59.57	xvi
	(xi)	High commission charges	111	72.34	xi
5.	**Organisational constraints in marketing**				
	(i)	Lack of regulation in the agricultural market	105	68.09	xiii
	(ii)	Lack of cooperative market	102	65.96	xiv
	(iii)	Lack of regulated market	115	74.47	x
	(iv)	Inadequate storage facility	121	78.72	viii
	(v)	Inadequate cold chain transport facility	128	82.98	vi
	(vi)	Lack of grading and standardisation	125	80.85	vii
	(vii)	Lack of department which can be made aware about the market news and information	118	76.60	ix
	(viii)	Lack of sufficient number of processing unit	138	89.36	iii
	(ix)	Lack of awareness about market news and intelligence	111	72.34	xi
	(x)	Large number of middlemen	108	70.21	xii

Table 6: Contd……………

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6.		**Demand side**			
	(i)	Low purchasing power of the consumer	16	10.64	xxiii
	(ii)	Low demand of product	16	10.64	xxiii
7.		**Supply side**			
	(i)	High perishability in nature	92	59.57	xvi
	(ii)	Difficult in grading	88	57.45	xvii
	(iii)	Slow production process	108	70.21	xii
	(iv)	Poor transportation facilities and road from village to market	98	63.83	xv
	(v)	Small holding of the produce	88	57.45	xvii
	(vi)	Large distance from village to market	82	53.19	xviii
8.		**Other problem**			
	(i)	Monkey's nuisance	154	100.00	i

recommendation (11) Lack of grading and standardisation.

The constraints ranged between 70 to < 80 per cent were (1) Lack of timely advice and guidance by extension personnel (2) Absence of storage facility (3) Inadequate storage facility (4) Lack of department which can be made aware about the market news and information (5) Lack of regulated market (6) Lack of effective supervision (7) Inadequate availability of mass media sources of information (8) Non- availability of agricultural credit (9) Lack of awareness about market news and intelligence (10) High commission charges (11) Large number of middlemen (12) Slow production process.

The constraints ranged between 60 to < 70 per cent were (1) Low risk bearing capacity (2) Lack of regulation in the agricultural market (3) Lack of cooperative market (4) Poor transportation (5) Poor transportation facilities and road from village to market.

The constraints ranged between 50 to < 60 per cent were (1) Poor marketing facility (2) High perishability in nature (3) Lack of support Price (4) Difficult in grading (5) Small holding of the produce (6) Large distance from village to market (7) Poor coordination and cooperation among grass root level extension worker.

Summary and conclusion:

The summary of the study is as follows:

On an average, the cost of cultivation cauliflower were amounted as Rs. 50573.84/ha. The major share of cost of cultivation gone to hired labour cost is 20.18 per cent. The Cost A1 cauliflower was calculated as Rs. 21653.84/ha. The input – output ratio of cauliflower

came to 1:3.48.

There were two marketing channels identified in the study area. Channel- I: Producer - consumer. Channel-II: Producer – commission agent/retailer. The channel-I found more efficient than channel –II for the selected vegetables.

Monkey's nuisance was appeared to be the most common problem in study area as frequency recorded 100 per cent. The constraints ranged between 90 to < 100 per cent were (1) Inadequate follow-up services (2) Lack of soil testing facilities (3) High cost of technology (4) Poor economic condition of farmers.

Recommendations :

– Monkey's nuisance to be addressed to enhance the vegetable production in Bilaspur. The State Agriculture Department should take initiative with Forest Department to resolve the problem.

– Initiative should be taken up by the government to develop soil testing facilities in vegetable growing areas.

– The government policies should be framed aiming at increasing and improving the credit and extension services to vegetable growers. A high quality financing and extension services will help to address the problem like high cost of technology, poor economic condition of the farmer, deficiency in technical know how, inadequate demonstration of new technology, complicated procedure to avail loan, lack of timely advice and guidance by extension personnel etc.

– A mapping of vegetable marketing should be done and accordingly infrastructure and marketing facilities to be developed.

– Farmers are advised to adopt the varieties of

vegetables having cooking as well as marketing quality to fetch better prices of the produce in the market.

– Horticultural crop producer's cooperative societies should be formed to gain the benefit of economies of sizes involved in different operations in production and marketing of vegetables.

– Government initiative on issues of post harvest technology of vegetables to be come forward in terms of education, research and extension services. This will provide an ample opportunity in employment generation to youngster and also minimize the risk involved in marketing of vegetables.

– An initiative by government must be taken up for model development on marketing information and intelligence along with provision of price forecasting keeping the interest of vegetable growers for a better, effective and efficient farming.

– Irrigation facilities are to be developed in water scarce area to increase the sown area in the district.

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