



## ECONOMICS OF PRODUCTION AND MARKETING OF MAIZE IN WESTERN MAHARASHTRA

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**Abstract:** *The present investigation was attempted to study the resource use structure, to estimate the cost of cultivation and to study the marketing of maize in western Maharashtra. In all, 90 farmers were selected from western Maharashtra. The data related to the Agricultural year 2014-15 was taken for the present study. The sample farmers were classified into three size groups of holdings i. e. small, medium and large. The findings of the study showed that Cost 'C' was the highest in large size group (Rs. 48795.57) followed by medium (Rs. 45311.31) and small (Rs. 44869.23) size groups, respectively. It can be revealed from the above discussion that the pattern of cost on various items of cost of cultivation was comparatively less in medium size group but more or less similar among the other size groups of holdings.*

*The benefit cost ratio at overall level was 1.11. However it was maximum in small size (1.16) and minimum in large size group (1.04). In all two important marketing channels were observed in the study area for maize marketing. Majority (63.71 %) of maize producer sold their produce through I<sup>st</sup> marketing channel i. e. Producer → Local trader → Commission agent → Wholesaler → Retailer → Consumer. It is followed by channel II (28.81 %). Per quintal price realized by the maize growers ranged from Rs. 931.25 and 911.11 in different two marketing channels.*

### Introduction

In India, maize is the third most important food crops after rice and wheat. According to advance estimate it is cultivated in 8.7m ha (2010-11) mainly during *kbharif* season which covers 80% area. The predominant maize growing states that contributes more than 80 % of the total maize production are Andhra Pradesh (20.9 %), Karnataka (16.5%), Rajasthan (9.9 %), Maharashtra (9.1%), Bihar (8.9%), Uttar Pradesh (6.1 %), Madhya Pradesh (5.7 %), Himachal Pradesh (4.4 %).

Maize is a short duration crop which is adaptable to a wide range of agroclimatic situations, having high yield potential, suitable for cultivation in all seasons, due to its day neutral nature and can fit well in various inter and sequence cropping systems.

The demand for maize crop is increasing very tremendously therefore it is felt necessary to study the various reasons behind it; looking to the above the present study is undertaken with the following objectives to study the input utilization for cultivation of maize, to study the costs, returns and profitability of maize, to study the marketing

channels and marketing cost of maize and to study the problems in production and marketing of maize and suggest the remedial measures.

### Methodology

The study was based on secondary data collected in the CPMCC scheme, Department of Agricultural Economics, MPKV, Rahuri. On the basis of size of operational holding, the maize cultivators categorized into three size groups as small (below 2.00 ha.), medium (2.00 to 4.00 ha.) and large (4.01 ha. and above). In all 90 cultivators, were selected randomly, comprising 30 each from small, medium and large size group of holdings. The secondary data thus, collected was compiled and analyzed to fulfill the objectives of the present study. The data were analyzed by using simple tabular method.

### Results

#### Input utilization on maize farms

Input utilized for production of maize and its prices on three different size groups of holdings for the years 2014-15 were worked out and the average is presented in Table 1.

Resource use structure of maize revealed that, the seed utilized at the overall level was 16.10 kg/ha for the study period. The human labour utilized per hectare was 76.23 man-days. The bullock labour use was 5.44 pair days/ha and utilization of machine power was 9.91 hrs/ha. The maize farms have applied 9.50 quintals of organic manure per hectare. The average nitrogen utilized by the farms was 91.10 kg/ha, whereas phosphorus used was 55.91 kg/ha and potassic fertilizer applied by the

farms was 12.56 kg/ha. The average output of maize was 37.44 q/ha.

The study on maize pointed out that, increase in the use of family human labour was observed with increase in the size group of holdings, indicating economies of scale, while decrease in use of resources like machine labour was noticed with increase in size group of holdings. Higher level of input utilization was observed in case of family human labour, organic manure and nitrogenous fertilizers on medium size group of holdings.

**Table 1: Input utilization on maize farms.**

(Per ha)

Sr. No.	Particulars	Size group			
		Small	Medium	Large	Overall
<b>A</b>	<b>Inputs</b>				
1	Area (ha)	4.87	5.06	5.13	15.06
2	Total Hired Labour (man-days)	28.86	36.19	33.20	32.80
	a) Male	12.25	12.67	16.87	13.97
	b) Female	16.61	23.52	16.33	18.83
3	Total Family Labour (man-days)	41.09	43.73	45.36	43.43
	a) Male	24.36	23.15	26.38	24.64
	b) Female	16.74	20.58	18.98	18.79
4	Total human labour	69.95	79.92	78.56	76.23
5	Bullock Power (pair-day)	4.95	4.55	6.80	5.44
6	Machine Power (hr)	10.55	10.04	9.16	9.91
7	Seed (kg/ha)	17.45	15.42	15.50	16.10
8	Organic manure (q)	5.95	7.11	15.20	9.50
9	Nitrogen (kg)	85.69	93.48	93.89	91.10
10	Phosphorus (kg)	54.00	60.47	53.22	55.91
<b>11</b>	Potassium (kg)	16.22	8.30	13.29	12.56
12	<b>Output- yield (q/ha)</b>	36.14	38.32	37.81	37.44

**Per hectare cost of cultivation of maize**

The per hectare cost of cultivation of maize was worked out by using standard cost concepts normally used in the farm management studies. The information on item wise cost of cultivation of maize for different size group of holdings is presented in the Table 2.

It is revealed from the table that at overall level, per hectare cost of cultivation of maize i.e. cost 'C' was worked out to be Rs. 46355.22. Among the different items of cost, the maximum were

contributed by total human labour i.e. Rs. 13938.51 (30.08%) followed by rental value of land Rs. 8541.80 (18.43%). The other important items of cost were bullock labour (9.79 %), fertilizers (9.64 %) and seed (4.94 per cent). The expenditure on amount of machine labour, manures, irrigation cost, repairs, incidental charges, land revenue and interest on fixed capital was together worked out to be 13.84 per cent of the total cost of cultivation. The per quintal cost of production was Rs. 1238.07 and 37.44 qtls productivity level.

**Table 2: Per hectare cost of cultivation of maize** (Figures in Rs.)

Sr. No.	Particulars	Size groups			Overall
		Small	Medium	Large	
1.	Hired labour				
a.	Male	2723.61 (6.07)	2875.89 (6.35)	3242.69 (6.65)	2951.59 (6.37)
b.	Female	2227.93 (4.79)	3083.40 (6.80)	2654.97 (5.48)	2660.82 (5.69)
2.	Bullock labour	5222.93 (11.64)	3450.16 (7.61)	4962.96 (10.17)	4538.64 (9.79)
3.	Machine labour	3266.94 (7.28)	3555.34 (7.85)	3749.51 (7.68)	3528.22 (7.61)
4.	Seed	2234.09 (4.98)	2328.06 (5.14)	2311.89 (4.74)	2292.16 (4.94)
5.	Manure	677.62 (1.51)	798.42 (1.76)	1241.72 (2.54)	910.36 (1.96)
6.	Fertilizer	3973.36 (8.86)	4519.44 (9.97)	4891.14 (10.02)	4469.47 (9.64)
7.	Irrigation charges	1143.19 (2.55)	1036.48 (2.29)	1361.05 (2.79)	1181.55 (2.55)
8.	Plant protection	98.56 (0.22)	142.29 (0.31)	107.21 (0.22)	116.20 (0.25)
9.	Repairs and incidental charges	1456.80 (3.25)	1473.56 (3.25)	927.85 (1.90)	1282.25 (2.77)
10.	Working capital	23024.70 (51.32)	23263.05 (51.34)	25451.00 (52.16)	23931.27 (51.63)
11.	Interest on working capital	1381.48 (3.08)	1395.78 (3.08)	1527.06 (3.13)	1435.88 (3.10)
12.	Depreciation on implements and machinery	1480.05 (3.30)	1464.32 (3.23)	1948.97 (3.99)	1634.50 (3.53)
13.	Land revenue and taxes	54.30 (0.12)	52.81 (0.12)	33.17 (0.07)	46.60 (0.10)
14.	Cost 'A'	25940.53 (57.81)	26175.97 (57.77)	28960.19 (59.35)	27048.24 (58.35)
15.	Interest on fixed capital @ 10 %	2391.97 (5.33)	2258.18 (4.98)	2662.25 (5.46)	2439.09 (5.26)
16.	Rental value of land	8602.44 (19.17)	8639.22 (19.07)	8388.14 (17.19)	8541.80 (18.43)
17.	Cost 'B'	36934.94 (82.32)	37073.36 (81.82)	40010.59 (82.00)	38029.13 (82.04)
18.	Family labour Male	5232.62 (11.66)	5221.34 (11.52)	5882.41 (12.06)	5449.85 (11.76)
	Female	2702.67 (6.02)	3016.60 (6.66)	2902.58 (5.95)	2876.25 (6.20)
19.	Cost 'C'	44869.23 (100)	45311.31 (100)	48795.57 (100)	46355.22 (100)
20.	Yield value	51940.45	52152.17	50527.88	51530.41
21.	Per quintal cost	1241.55	1182.44	1290.52	1238.07

(Figures in the parentheses are the percentage to the total cost of cultivation)

The share of cost 'A' and Cost 'B' in the total cost of cultivation of maize at overall level was found to be Rs. 27048.24 (58.35 %) and Rs. 38029.13 (82.04 %), respectively. Among the different size groups, the cost 'A' was found to be highest in large size group (59.35 %) followed by small (57.81 %) and medium size group (57.77 %), respectively. The cost 'B' found to be highest in small size group (82.32 %)

followed by large (82.00 %) and medium (81.82 %) size groups, respectively.

It is also observed from the table that the per hectare total output received at overall level was Rs. 51530.41. It was highest in medium size group (Rs. 52152.17) followed by small (Rs. 51940.45) and large (Rs. 50527.88) size group of holdings.

The per quintal cost of production of maize was worked out to be Rs. 1238.07 at overall level. Among the different size groups per quintal cost of production was minimum in medium size group and it was due to higher productivity.

### Resource use gap on maize farms

Inputs play a significant role for boosting production of maize. The production of maize depends on judicious and balanced use of inputs. In the light of these specific relationships between inputs and output of maize, the data have been

analyzed further to work out the gaps in the actual use of levels and recommended levels of inputs and resultant output of maize on per hectare basis on small, medium and large farms. The results obtained from the analysis are presented in Table 3.

It has been clearly indicated that less use use in the seed quantity was observed than the recommended levels of inputs. Only in case of phosphorus fertilizer the excess use was observed on small and medium farms and all other inputs the less use was observed on all size groups of holdings. Notable gap was observed in use of manures, which was 82.20 per cent. In case of use of nitrogen, at the overall level the gap was 24.06 per cent, and in potash the gap was 66.77 per cent. In case of yield, there were near about 25 per cent less returns received due to the less use of inputs.

**Table 3: Resource use gap on maize farms** (Per ha)

Sr. No.	Particulars	Size group			
		Small	Medium	Large	Overall
<b>I</b>	<b>Seed (kg)</b>				
A	Recommended	18	18	18	18
B	Actual use	17.45	15.42	15.50	16.10
C	Gap	0.55	2.58	2.50	1.90
D	Per cent gap	3.03	14.36	13.91	<b>10.54</b>
<b>II</b>	<b>Manure (qtls)</b>				
A	Recommended	50	50	50	50
B	Actual use	5.95	7.11	15.20	9.50
C	Gap	44.05	42.89	34.80	40.50
D	Per cent gap	88.09	85.77	69.59	<b>81.01</b>
<b>III</b>	<b>Nitrogen (kg)</b>				
A	Recommended	120	120	120	120
B	Actual use	85.69	93.48	93.89	91.10
C	Gap	34.31	26.52	26.11	28.90
D	Per cent gap	28.59	22.10	21.76	<b>24.06</b>
<b>IV</b>	<b>Phosphorus (kg)</b>				
A	Recommended	60	60	60	60
B	Actual use	54.00	60.47	53.22	55.91
C	Gap	6.00	-0.47	6.78	4.09
D	Per cent gap	9.99	-0.79	11.30	<b>6.81</b>
<b>V</b>	<b>Potash (kg)</b>				
A	Recommended	40	40	40	40
B	Actual use	16.22	8.30	13.29	12.56
C	Gap	23.78	31.70	26.71	27.44
D	Per cent gap	59.45	79.25	66.77	<b>68.59</b>
<b>VI</b>	<b>Yield (qtls)</b>				
A	Recommended	50	50	50	50

B	Actual yield	36.14	38.32	37.81	37.44
C	Gap	13.86	11.68	12.19	12.56
D	Per cent gap	27.72	23.36	24.38	<b>25.12</b>

**Costs and returns structure on maize farms.**

Maize crop is considered as a heavy feeder among the other *kharif* food grain crops. The cost of cultivation of maize was worked out and the detailed

costs and returns structure on different categories of maize farms and at the overall level for the years 2014-15 were examined and presented in Table 4.

**Table 4: Costs and returns structure on maize farms** (Per ha)

Sr. No.	Particulars	Size group			
		Small	Medium	Large	Overall
1	Total cost				
	i) Cost 'A'	25940.53	26175.97	28960.19	27048.24
	ii) Cost 'B'	36934.94	37073.36	40010.59	38029.13
	iii) Cost 'C'	44869.23	45311.31	48795.57	46355.22
2	Profit at				
	i) Cost 'A'	25999.92	25976.21	21567.68	24482.17
	ii) Cost 'B'	15005.51	15078.81	10517.29	13501.28
	iii) Cost 'C'	7071.22	6840.86	1732.30	5175.19
3	Gross income	51940.45	52152.17	50527.88	51530.41
4	B:C ratio				
	i) Cost 'A'	2.00	1.99	1.74	1.91
	ii) Cost 'B'	1.41	1.41	1.26	1.36
	iii) Cost 'C'	<b>1.16</b>	<b>1.15</b>	<b>1.04</b>	<b>1.11</b>

Costs and returns structure revealed that per hectare cost of cultivation of maize was Rs.44869.23, Rs.45311.31 and Rs.48795.57 on small, medium and large size group of holdings, respectively and it has decreased in medium size of holdings and increased in large size group of holdings and at the overall level it was Rs.46355.22. Gross income was Rs.51940.45, Rs.52152.17 and Rs.50527.88 on small, medium and large size group of holdings, respectively and at the overall level it was Rs.51530.41. The net profit at Cost 'C' was Rs.7071.22, Rs.6840.86 and Rs.1732.30 on small, medium and large size group of holdings, respectively and at the overall level it was Rs.5175.19. The benefit: cost ratio was in the range of 1.04 to 1.16 during the study period.

**Marketing channels**

Method of sale affects the efficiency of marketing and price spread in different channels. In local market, the produce was sold directly to consumer or through retailers to the consumer. In case of sale in the Agricultural Produce Market Committee markets the maize sold produce through

commission agents, then commission agent on receipt of produce, arranges for sale in these markets through open auction method of sale. The marketing system for assembling and distribution of maize consisted of producer and other intermediaries are as below.

1. Producer-Wholesaler/Commission agent-Retailer-Consumer
2. Producer-Village trader - Retailer- Consumer.

In all two important marketing channels were observed in the study area for maize marketing. Majority (63.71 per cent) of maize producer sold their produce through I<sup>st</sup> marketing channel i. e. Producer → Local trader → Commission agent → Wholesaler → Retailer → Consumer. It is followed by channel II (28.81 per cent).

**Marketing cost**

The per quintal cost of marketing of maize incurred through different agencies is given in Table 5.

It is revealed from the table that the average marketing cost in channel-I was Rs. 90.63 and in channel-II Rs. 6.45. The major items of cost in the case

of channel-I were commission charges (40.95 %), hamali (5.10 %).  
transport (43.41 %), packaging charges (6.90 %) and

**Table 5: Channelwise per quintal cost of marketing of maize (Rs.)**

Sr. No.	Particulars	Channel-I	Channel-II
1.	Packaging charges	6.25 (6.90)	6.37 (98.76)
2.	Transportation	39.34 (43.41)	-
3.	Commission	37.11 (40.95)	-
4.	Weighing charges	2.72 (3.00)	
5.	Hamali	4.62 (5.10)	-
6.	Market fee	0.54 (0.60)	-
7.	Losses during transit	0.05 (0.06)	0.08 (1.24)
	Total market cost	90.63 (100)	6.45 (100)

(Figures in the parentheses indicate the percentage to the respective total)

In the case of channel-II the total marketing cost formed grading and packaging charges to an extent of 98.76 per cent, losses during transit with 1.24 per cent.

**Marketing costs, marketing margins and price spread in different marketing channels: Maize crop**

is considered as a heavy feeder among the other *kharif* food grain crops. The marketing costs, marketing margins and price spread in different marketing channels of maize was worked out and the detailed were presented in Table 6.

**Table 6: Marketing costs, marketing margins and price spread in different marketing channels (Fig. in Rs./qtls)**

Sr. No.	Particulars	Channels	
		I	II
1.	Producer		
a.	Gross price received	931.25 (74.59)	911.11 (89.71)
b.	Cost incurred	42.60 (3.41)	33.11 (3.25)
c.	Net price received	888.65 (71.18)	878.00 (86.45)
2.	Local trader		
a.	Price received	888.65 (71.18)	
b.	Cost incurred	31.50 (2.52)	
c.	Margin	41.92 (3.36)	
3.	Commission agent		
a.	Price received	962.07 (77.06)	
b.	Cost incurred	36.37 (2.91)	
c.	Margin	52.23 (4.18)	
4.	Wholesaler		
a.	Price received	1050.68 (84.16)	
b.	Cost incurred	40.90 (3.28)	
c.	Margin	56.99 (4.57)	
5.	Retailer		
a.	Price received	1133.08 (90.76)	878.00 (86.45)
b.	Cost incurred	46.91 (3.76)	36.25 (3.58)
c.	Margin	68.44 (5.48)	101.32 (9.98)

6.	Consumers' price	1248.42 (100)	1015.67 (100)
7.	Total marketing cost+ commission of intermediaries	386.38 (30.95)	170.68 (16.80)
8.	Producers share in consumers' rupee (%)	68.24	86.45

(Figures in parentheses indicates percentage to the consumers' price)

It is revealed from the table that, per quintal price realized by the maize growers ranged from Rs. 931.25 and 911.11 in different two marketing channels. The highest net price was received in channel-I. The producers share in consumers rupee was the highest (86.45 per cent) in channel II and the lowest (68.24 per cent) in channel I, it was due to higher marketing cost and commission of intermediaries. Up to 32 per cent share of consumer's rupee was galloped by the intermediaries in marketing of maize and the producers share in consumer's rupee was up to 68 per cent only.

### Conclusions

1. Cost 'C' was the highest in large size group (Rs. 48795.57) followed by medium (Rs. 45311.31) and small (Rs. 44869.23) size groups, respectively. It can be revealed from the above discussion that the pattern of cost on various items of cost of cultivation was comparatively less in medium size

group but more or less similar among the other size groups of holdings.

- The benefit cost ratio at overall level was 1.11. However it was maximum in small size (1.16) and minimum in large size group (1.04)
- In all two important marketing channels were observed in the study area for maize marketing. Majority (63.71 per cent) of maize producer sold their produce through I<sup>st</sup> marketing channel i. e. Producer → Local trader → Commission agent → Wholesaler → Retailer → Consumer. It is followed by channel II (28.81 per cent).
- Per quintal price realized by the maize growers ranged from Rs. 931.25 and 911.11 in different two marketing channels. The highest net price was received in channel-I. The producers share in consumers rupee was the highest (86.45 per cent) in channel II and the lowest (68.24 per cent) in channel I, it was due to higher marketing cost and commission of intermediaries.

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