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Cost, returns and profitability of maize cultivation in Aurangabad district of Maharashtra

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Abstract
The present study was designed to estimate cost and returns in Aurangabad district has been purposively selected for the study because Vaijapur and Gangapur tehsils having highest area under maize crop as compared to other tehsils in the Aurangabad district. 10 *kharif* Maize growers was randomly selected from each selected villages. Thus from 6 villages, 60 growers was selected. Per hectare labour utilization of maize revealed that. In case of maize 31.16 man days of hired human labour and 19.11 man days of family human labour were utilized on maize farm i.e. in total 50.27 man days human labour were utilized for maize crop. The use of hired labour is utilized maximum on farm. On the farms 10.1 pair days of bullock labour were utilized per hectare. Cost-A was ₹ 49033.22 and Cost-B was ₹ 66953.48, for a total cost per hectare of ₹ 72783.17, output input ratio (B: C Ratio) was 1.29, showing net profit was earn in maize crop 21624.83 and yield of maize main produce 48.47 q/ha.

Keywords: Maize, cost, returns, profitability

Introduction
Zea mays L., Maize, Ch.no. (2n = 20), family: (Gramineae) Origin: (Mexico) one of the most adaptable developing crops, maize can grow in a variety of agro climatic settings. Because it has the largest genetic yield potential of all the cereals, maize is referred to as the "queen of cereals" internationally. It produces 36 per cent (782 metric tonnes) of the world's grain production and is grown on about 150 million hectares in roughly 160 nations with a broad variety of soil, climate, and management approaches. Its production in the next season is anticipated to reach 24.51 MMT (2020-21).
Total supply would be 25.2 MMT as a result. Primarily during the 80 per cent-covering *kharif* season. In India, maize makes up nearly 9 per cent of the nation's food supply. Maize serves as a basic raw material as an ingredient in thousands of industrial products, including starch, oil, protein, alcoholic beverages, food sweeteners, pharmaceutical, cosmetic, film, textile, gum, package and paper industries, etc. In addition to serving as a staple food for humans and high-quality animal feed, maize also serves as a raw material for thousands of other agricultural products.

Materials and Method
For the 2020-21 study year, survey method of data collection was used for collection of data from the selected area. The Aurangabad district has been purposively selected for the study because Vaijapur and Gangapur tehsils having highest area under maize crop as compared to other tehsils in the district. From the each tehsil, three villages were selected on the basis of highest area under of maize crop production. The villages *viz*., Bhaygaon, Khandala and Ekodi sagaj from Vaijapur tehsil, villages *viz*., Katepimpalgaon, Akole wadgaon and Manjari from Gangapur tehsil and Ten cultivators from each village were selected. 10 *kharif* Maize growers was randomly selected from each selected villages. Thus from 6 villages, 60 growers was selected. Farmers were interviewed in person at their farm and residence.

Statistical tools applied: Frequency, Percentage, Average

Results and Discussion
1. Physical inputs and outputs in maize production
Per hectare physical inputs and outputs of maize production were calculated and presented in table 1. It was observed that, the use of hired human labour was 31.16, family human labour was 19.11 man days and use of bullock labour was 10.1 pair days in maize farm. On the contrary, use of machine labour was 12.02 hours/ha.

The use of seed was 17.80 kg/ha in maize farm. In regard to manure, the quantity of 2.90 quintals/ha was used in maize farm. Use of nitrogen, phosphorous and potash was 74.76, 42.12 and 25.88 kg/ha, respectively in maize farm. Use of plant protection was 1.10 litre. It was also observed that, main produce of maize was 48.47 quintals/ha and by produce was 4.63 quintals/ha.

Table 1: Per hectare use of physical input and output in maize production (Unit/ha)

Sr.no	Particulars	Unit	Maize farm
Input			
1.	Hired human labour	man day	31.16
2.	Family human labour	man day	19.11
3.	Bullock labour	pair day	10.1
4.	Machine labour	hours	12.02
5.	Seed	kg	17.80
6.	Manure	t	2.90
7.	Fertilizers		
	N	kg	74.76
	P	kg	42.12
	K	kg	25.88
8.	Plant protection	lit	1.10
Output			
9.	Main produce	qtl	48.47
10.	By produce	qtl	4.63

2. Per hectare cost of cultivation of maize production

Per hectare cost of cultivation of maize were calculated and presented in Table 2. The result revealed that, the per hectare cost of cultivation was estimated to ₹ 49033.22 in which Cost-A consist 67.37 per cent, Cost-B, ₹ 66953.48, 92.00 per cent and cost-C is ₹ 72783.17, 100 per cent respectively. Expenditure on machine labour was ₹ 9616.00 *i.e.* 13.21 per cent. Next item of expenditure is rental value of land i.e. ₹ 15604.67 (21.43 per cent), hired human labour accounted, ₹ 11884.73 (16.32 per cent), seed ₹ 6789.81 (9.32 per cent), family human labour ₹ 5829.69 (8.00 per cent), interest on working capital ₹ 1304.59 (1.80 per cent), phosphorus ₹ 2532.25 (3.48 per cent), manure accounted, ₹ 1437.32 (1.98 per cent), bullock labour ₹ 7007.00 (9.62 per cent), interest on fixed capital ₹ 2315.59 (3.19 per cent), depreciation on farm assets ₹ 4112.20 (5.66 per cent), nitrogen ₹ 973.37 (1.33 per cent), potash ₹ 1380.18 (1.90 per cent), incidental charges ₹ 491.59 (0.68 per cent), plant protection ₹ 1374.18 (1.89 per cent) and land revenue ₹ 130 (0.18 per cent) respectively.

Table 2: Per hectare cost of cultivation of maize production

	Particulars	Unit	Quantity	Amount	Per cent
1.	Hired human labour	man day	31.16	11884.73	16.32
2.	Bullock labour	pair day	10.01	7007.00	9.62
3.	Machine labour	hour	12.02	9616.00	13.21
4.	Seed	kg	17.80	6789.81	9.32
5.	Manure	t	2.90	1437.32	1.98
6.	Fertilizer	kg			
7.	N		74.76	973.37	1.33
8.	P		42.12	2532.25	3.48
9.	K		25.88	1380.18	1.90
10.	Plant protection	lit	1.10	1374.18	1.89
11.	Land revenue	-	-	130	0.18
12.	Incidental charges	-	-	491.59	0.68
13.	Interest on working capital @ 6%	-	-	1304.59	1.80
14.	Depreciation on capital assets @10%	-	-	4112.20	5.66
15.	Cost A (1-14)	-	-	49033.22	67.37
16.	Rental value of land	-	-	15604.67	21.43
17.	Interest on fixed capital @ 10%	-	-	2315.59	3.19
18.	Cost B (15-17)	-	-	66953.48	92.00
19.	Family human labour	man day	19.11	5829.69	8.00
20.	Cost C (18-19)	-	-	72783.17	100

3. Profitability of maize production

Per hectare profitability in maize production was calculated and presented in Table 3. The results revealed that, per hectare gross return was found to be ₹ 94408.00 in maize farm. It was clear that, farm business income, family labour income and net profit/ha were ₹ 45374.78 ₹ 27454.52 and ₹ 21624.83, respectively. It was clear that, output-input ratio was 1.29. maize crop was profitable enterprise. Per quintal cost of production of maize was ₹ 1453.85. This result similar with Murthy *et al.* (2015) [4] regarding net profitability of maize production and Jain *et al.* (2019) [2] regarding per hectare profitability of maize production.

Table 3: Per hectare profitability of maize production (₹/ha)

Sr. No.	Particulars	Amount
1.	Returns from main produce (Seed)	92093.00
2.	Returns from by produce	2315.00
3.	Gross returns (item 1+2)	94408.00
4.	Cost-A	49033.22
5.	Cost-B	66953.48
6.	Cost-C	72783.17
7.	Farm business income (Gross return minus cost-A)	45374.78
8.	Family labour income (Gross return minus cost-B)	27454.52
9.	Net profit (Gross return minus cost-C)	21624.83
10.	Output Input ratio (B:C Ratio) (Gross return divided by cost-C)	1.29
11.	Per quintal cost of production (Cost-C minus by produce value divided by main produce quantity)	1453.85

Conclusion

The present investigation was intended to depict the picture of the maize growing enterprises in Aurangabad district. The results revealed that, per hectare gross return was found to be ₹ 94408.00 in maize farm. It was clear that, farm business income, family labour income and net profit/ha were ₹ 45374.78 ₹ 27454.52 and ₹ 21624.83, respectively. It was clear that, output-input ratio was 1.29. It implied that, when 1 rupee spent on maize production, it would lead to give the returns of ₹ 1.29. Per quintal cost of production of maize was ₹1453.85.

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