

Original Research Article

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Cost, Returns and Profitability of *Kharif* Maize in Solapur District of Maharashtra, India

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ABSTRACT

Keywords

Maize, Cost, Gross return, Net profit and B:C ratio

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Maize (*Zea mize*) belongs to family (Gramineae). It is the third most important cereal food grain crop in the world followed by rice and wheat. The origin of maize is Mexico in Central America. It contributes about 20 per cent world's total cereal production. For present study multistage sampling design was used in selection of district, tehsils, and village and maize growers. On the basis of high area under maize crop Malshiras, Pandharpur and Sangola tehsils were selected. From selected three tehsils 6 villages were selected purposely on the basis of highest area under maize crop. From each village 15 maize growers were selected. In this way 90 maize growers were selected for the present study. The information collected with respect to expenditures and returns were analyzed in tabular form by using cost concept like Cost –A, Cost- B and Cost – C. Data pertain to the year 2017-2018 The result revealed that Cost – A was Rs.49631.66 in which share of Cost –B was Rs.65483.72 while that of Cost – C was Rs.71276.94. Gross return was found to be Rs.92475.42 and net profit was Rs.21198.48. The B:C ratio was 1.29.

Introduction

Maize is a major source of cooking oil (corn oil) and of maize gluten. Maize starch can be hydrolyzed and enzymatically treated to produce syrups, particularly high fructose corn syrup, a sweetener; and also fermented and distilled to produce grain alcohol. Grain alcohol from maize is traditionally the source of bourbon whiskey. Maize is sometimes used as the starch source for beer. It is also nutritive for adults of different ages.

The green straw is suitable for making silage. Maize is also used as the fodder for livestock.

The 100 grams of maize grains contains carbohydrate 71-72 kcal, sugars 2-3 grams, dietary fibers 9-10 grams, fats 4-45 grams and proteins 9-10 grams minerals 1-4 grams (Source: Agmarknet). The nutrients are very important for the smooth functioning of the body. It is a rich source of carbohydrates, besides this, it provides essential body building substances such as minerals and proteins. It is also a rich source of water (75.96 grams). Maize is consumed by the people in India in many forms, it can be consumed as a rotis or breads, in the forms of pop corns or a pop grains. Besides this, maize is used in preparation of starch, syrup,

glucose, paper adhesive, acetic acid and lactic acids, etc., the demand for which is increasing day-by-day.

The Maharashtra is leading state as far as area under the maize cultivation is considered followed by Rajasthan and Karnataka. But in the case of production and productivity, it lags behind in the list. The average yield of maize in Maharashtra is higher than the all India average. In 2017-18, the area under maize crop is 1097 (000 ha) with production 3450.4 (000 tonnes) and productivity was 3143 (Kg/ha) (Source: Krishi.maharashtra.gov.in). The area under *kharif* maize in 2017-18 is 913.8 (000 ha) with production 2977.2 (000 tonnes) and productivity was 3248 (Kg/ha) (Source: Krishi.maharashtra.gov.in).

To identify the costs, returns and profitability in maize production.

Materials and Methods

Multistage sampling design was adopted for selection of the district, tehsil, village and paddy growers. In first stage, Solapur district was purposively selected on the basis of highest area under maize crop. In the second stage, Malshiras, Pandharpur and Sangola tehsils were selected on the basis of highest area under maize crop. In the third stage, 6 villages were selected from each selected tehsils.

In the fourth stage, from each of the selected villages, 15 maize growers were randomly selected. In this way 90 maize growers were selected for the present study. Data were collected with the help of presented schedule by personal interview method for the year 2017-2018. Data were converted to per hectare basis in tabular form; statistical tools like arithmetic mean, percentage and ratio were used for accounting the cost and returns in maize production.

The cost concept like Cost –A, Cost –B, and Cost –C were used for cost evaluation and to estimate profitability in maize production. Cost - A include the item namely, hired human labour, bullock labour, machine labour, seed, fertilizer, plant protection, irrigation, land revenue, incidental charges, interest on working capital and depreciation on assets. Cost-B comprises of the cost-A plus rental value of land and interest on fixed capital. Cost-C includes the cost-B plus family labour cost. The terms and concepts used in present study were as follows. Interest on working capital included by charging interest at the rate of 13 per cent items of expenditure as hired human labour, bullock labour, machine labour, seed, fertilizers, manures, plant protection, land revenue an incidental charges for crop duration. Depreciation is the decrease in the value of asset and 10 per cent on the present value at the beginning of the year of farm implements and machinery was taken and only the proportionate charges were taken for the estimate as 1/6th the value of gross produce that is value of main product plus value of by product minus land revenue. Interest on fixed capital by charging interest at the rate of 11 per cent on investment on commonly used assets like wooden implements, iron implements which were distributed on cropped area.

Results and Discussion

Per hectare physical inputs used and output obtained 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 31.14, family human labour was 18.99 man days and use of bullock labour was 11.1 pair days in maize farm. On the contrary, use of machine labour was 13.01 hours/ha. The use of seed was

17.44 kg/ha in maize farm. In regard to manure, the quantity of 2.97 quintals/ha was used in maize farm. Use of nitrogen, phosphorous and potash was 72.77, 41.10 and 26.90 kg/ha, respectively in maize farm. Use of plant protection was 9.57 litre. Use of irrigation was 3466.67 cubic meters/ha in maize farm. It was also observed from the Table 1 that, main produce of maize was 37.47 quintals/ha and by produce was 2.63 quintals/ha.

Per hectare cost of cultivation of maize

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 Rs.49631.66 in which Cost-A consist 69.58 per cent, Cost-B, 91.81 per cent and cost-C is 100 per cent i.e. Rs.65483.72, and Rs.71276.94 respectively. Expenditure on

machine labour was Rs.19847.46 i.e. 27.84 per cent. Next item of expenditure is rental value of land i.e. Rs. 14770.98 (20.72 per cent), hired human labour accounted, Rs.11877.12 (16.66 per cent), seed Rs.6652.54 (9.33 per cent), family human labour Rs.5793.22 (8.12 per cent), interest on working capital Rs.2488.48 (3.49 per cent), phosphorus Rs.1579.47 (2.21 per cent), manure accounted, Rs.1472.03 (2.06 per cent), bullock labour Rs.1185.54 (1.66 per cent), interest on fixed capital Rs. 1081.08 (1.51 per cent), irrigation accounted, Rs.1000 (1.40 per cent), depreciation on farm assets Rs. 956.23 (1.34 per cent), nitrogen Rs.948.92 (1.33 per cent), potash Rs.309.78 (0.94 per cent), incidental charges Rs. 491.59 (0.68 per cent), plant protection Rs.309.78 (0.43 per cent) and land revenue Rs.150 (0.21 per cent) respectively.

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	31.14
2.	Family human labour	man day	18.99
3.	Bullock labour	pair day	11.1
4.	Machine labour	hour	13.01
5.	Seed	Kg	17.44
6.	Manure	qtl	2.97
7.	Fertilizer		
	N	Kg	72.77
	P	Kg	41.10
	K	Kg	26.90
8.	Plant protection	liter	9.57
9.	Irrigation	m ³	3466.67
OUTPUT			
10.	Main produce	qtl.	37.47
11.	By-produce	qtl.	2.63

Table.2 Per hectare cost of cultivation of maize production

Sr. No	Particulars	Unit	Quantity	Amount	Per cent
1.	Hired human labour	man day	31.14	11877.12	16.66
2.	Bullock labour	pair day	11.1	1185.54	1.66
3.	Machine labour	Hour	13.01	19847.46	27.84
4.	Seed	Kg	17.44	6652.54	9.33
5.	Manure	qtl.	2.97	1472.03	2.06
6.	Fertilizer	Kg			
7.	N		72.77	948.92	1.33
8.	P		41.10	1579.47	2.21
9.	K		26.90	672.5	0.94
10.	Plant protection	Ltr	9.57	309.78	0.43
11.	Irrigation	m ³	3466.67	1000	1.40
12.	Land revenue	-	-	150	0.21
13.	Incidental charges	-	-	491.59	0.68
14.	Interest on working capital @ 13%	-	-	2488.48	3.49
15.	Depreciation on capital assets@10%	-	-	956.23	1.34
16.	Cost A (1-15)	-	-	49631.66	69.58
17.	Rental value of land	-	-	14770.98	20.72
18.	Interest on fixed capital @ 11%	-	-	1081.08	1.51
19.	Cost B (16-18)	-	-	65483.72	91.81
20.	Family human labour	man day	18.99	5793.22	8.12
21.	Cost C (19-20)	-	-	71276.94	100

Table.3 Per hectare profitability of maize production (Rs/ha)

Sr.No	Particulars	Amount
1.	Returns from main produce (Seed	91471.19
2.	Returns from by produce	1004.23
3.	Gross returns (item 1+2)	92475.42
4.	Cost-A	49631.66
5.	Cost-B	65483.72
6.	Cost-C	71276.94
7.	Farm business income (Gross return minus cost-A)	42843.76
8.	Family labour income (Gross return minus cost-B)	26991.7
9.	Net profit (Gross return minus cost-C)	21198.48
10.	Output Input 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)	730.45

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 Rs.92475.42 in maize farm. It was clear that, farm business income, family labour income and net profit/ha were Rs 42843.76 Rs 26991.7 and Rs 21198.48 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 Rs 1.29. Per quintal cost of production of maize was Rs.730.45.

In conclusion, use of hired human labour was 31.14 man days. It inferred that, as farm size increased it shows the positive relationship. On the contrary, use of family human labour was 18.99 man days. Use of machine labour was increased with an increase in farm size. Net profit of maize crop was Rs. 21198.48. It was clear that maize crop was profitable crop. It is observed that, there is scope to increase in use of machine labour area and family human labour for maize crop.

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