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An economic analysis of production of maize in Balrampur district of Chhattisgarh

¹Dr. Shweta Singh, ² Dr. Rohit Bhagat and ³Priyanka Sahu

¹Teaching Associate, Department of Fisheries basic science and humanities, Late Shri Punaram Nishad College of Fisheries, Kawardha, Chhattisgarh, India

²Research Scholar, Department of Agricultural Economics, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

³Department of Agricultural Statistics and Social Science, Late Dr. R.C.S.D. College of Agriculture and Research Station (CARS), Kanker, Indira Gandhi Krishi Vishwavidyalaya, Chhattisgarh, India.

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Corresponding Author: Dr. Shweta Singh

Abstract

The study conducted “An economic analysis of production of maize in Balrampur district of Chhattisgarh”. Maize (*Zea mays* L.) is a crucial crop in Indian agriculture, ranking third in significance after rice and wheat. This study was conducted in Balrampur district of Surguja division, Chhattisgarh state, focusing on their substantial maize cultivation areas. In view this present study seeks to examine the (i) To work out the cost and returns of maize in the study area. For fulfilment of objectives of the study, the field level primary data were collected from randomly selected 150 maize growers of 9 villages of Balrampur district for the agricultural year 2022-23. The major finding of the present study that the family member was 5.28 in Balrampur, the average cropping intensity was found to be 136.61% in Balrampur district, In Balrampur district, the average farm sizes for sampled maize growers were 0.49 hectares for marginal farmers, 1.52 hectares for small farmers, 2.54 hectares for medium farmers, and 7.49 hectares for large farmers. The cost of cultivation per hectare of maize was ₹44,888.60 in Balrampur district. The cost of cultivation per hectare exhibited an increasing trend corresponding to the farm size of holdings. Overall, the input-output ratio in maize cultivation was 1:1.86 in Balrampur district. On an overall basis net return in maize cultivation was ₹ 38704.30, ₹34385.10 per hectare in Balrampur district. The average yield of maize in the study area was 44.16 quintal per hectare in Balrampur district, which shows very satisfactory result. The average income over the seven cost categories was calculated as follows: Cost A1: ₹50,756.10, Cost A2: ₹50,756.10, Cost B1: ₹50,224.10, Cost B2: ₹41,890.70, Cost C1: ₹47,033.40, Cost C2: ₹38,700.10, Cost C3: ₹34,210.80, these figures represent the calculated average income over the specified cost categories in Balrampur district respectively.

Keywords: Gross return, net returns, B: C ratio, input output ratio

Introduction

Maize (*Zea mays* L.) is the world's leading crop, domesticated in Central America, and is known for its versatility and high genetic yield potential. It is the only food cereal crop adaptable to various seasons, ecologies, and uses. Maize has many types, including yellow/white grain, sweet corn, popcorn, and others. In India, maize is the third most important food crop, ranking 4th globally in cultivation area and 7th in production. The area under maize cultivation in India reached 10.04 million hectares in 2021-22.

India's maize production increased significantly from 1.73 million MT in 1950-51 to 33.62 million MT in 2021-22. Productivity has grown from 547 kg/ha to 2965 kg/ha, though it remains lower than the global average. Maize in India is cultivated in two seasons: kharif (rainy) and rabi (winter). Kharif maize, mostly rainfed, covers 83% of the area, but its productivity is lower (2706 kg/ha) compared to rabi maize (6105 kg/ha).

Madhya Pradesh and Karnataka lead in maize cultivation, followed by Maharashtra, Rajasthan, and Uttar Pradesh. Andhra Pradesh has the highest maize productivity, with districts like Krishna and West Godavari achieving up to 12

tons per hectare. Maize in India is mainly used for poultry feed (47%), livestock feed (13%), food (13%), and industrial purposes (12%).

In Chhattisgarh, maize cultivation has grown, especially in tribal areas. In 2020, the state produced 508,000 tons of maize, with significant contributions from the Bastar and Surguja divisions. Surguja covers the largest area for maize cultivation in the state, and Balrampur district has the largest maize area.

Methodology

Sampling technique of Balrampur district of Chhattisgarh was purposively chosen as the study area because, it has the larger area under Maize cultivation in the district. A multistage simple random sampling technique (SRS) was adopted to select the villages and the respondents, different farmer involved in Maize production and marketing in Balrampur district. The details of the sampling techniques at various stages are given as under:

Costs and returns of Maize cultivation

Despite the costs & return was worked out by old concepts, a standard method of cost of cultivation of Maize was also

used. This method is accepted by The Commission of Agricultural Costs and Prices (CACP). Under this method, the cost of cultivation was computed by using the 7 Cost concepts, which are known as cost A1, cost A2 cost B1, cost B2 and cost C1, cost C2, and cost C3.

Cost A1: Consist of following 16 items of costs:-

- Value of hired human labour (permanent and casual)
- Value of owned bullock labour
- Value of hired bullock labour
- Value of owned machinery
- Hired machinery charged
- Value of fertilizers
- Value of manure (produced on farm and purchased)
- Value of seed (both farm-produced and purchased)
- Value of insecticides and fungicides.
- Irrigation charges (both of the owned and hired tube wells, pumping sets etc.)
- canal-water charges
- Land revenue, cesses and other taxes
- Depreciation on farm implements (both of the bullock drawn and worked with human labour)
- Depreciation on farm building, farm machinery.
- Interest on the working capital.
- Miscellaneous expenses (wages of artisans, and repairs to small farm implements)

Cost A2 = Cost A1 + Rent paid for Leased in Land.

Cost B1 = Cost A1 + Interest on value of Owned fixed Capital assets (excluding land)

Cost B2 = Cost B1 + Rental value of owned land

Cost C1 = Cost B1 + Imputed value of Family Labour.

Cost C2 = Cost B2 + Imputed value of Family labour.

Cost C3 = Cost C2 + 10 per cent of cost C2 taking as managerial allowances.

Income over different cost

- Income over cost A1 = Gross Return - Cost A1
- Income over cost A2 = Gross Return - Cost A2
- Income over cost B1 = Gross Return - Cost B1
- Income over cost B2 = Gross Return - Cost B2

- Income over cost C1 = Gross Return - Cost C1
- Income over cost C2 = Gross Return - Cost C2
- Income over cost C3 = Gross Return - Cost C3

Net income

It is the difference between total return and total expenses. So,

$$\text{Net income} = \text{Gross income} - \text{Total expenses}$$

Input-output ratio

It is the ratio of input and output, which is an under

$$\text{Input - Output Ratio} = \text{Value of output} / \text{Value of input used}$$

Results and Discussion

Cost of cultivation of maize

Cost of cultivation of maize for Balrampur district

The cost of cultivation for maize production is crucial for understanding the expenses incurred on various inputs and assessing farmers' profitability. According to the findings, the total cost of maize cultivation per hectare was ₹44,888.60, with variable costs accounting at 79.06% and fixed costs at 20.94% (Table 1 & Figure 2).

In human labor costs constituted the highest share at 30.49%, followed by material costs at 34.18%, power costs at 11.61%, and interest on working capital at 2.77% (Figure 1). Within the material costs, seeds accounted for 15.64% and fertilizers/manure for 13.41%. Hired labor costs were notably higher than family labor costs, with shares of 23.38% and 7.11%, respectively. The machine power accounted for 10.14%, while bullock power was minimal at 1.47% of the total variable costs. In fixed costs, including the rental value of land at 18.56%, remained consistent across farm sizes, which indicating economies of scale (Figure 2).

The total cultivation cost varied with farm size, with large farms incurring the highest cost at ₹48,066.20 per hectare and marginal farms incurred the lowest of ₹43,729.30 per hectare. Overall, the study demonstrates that the farm size increases, so does the total variable cost was reflecting higher expenditures on material inputs by larger farmers.

Table 1: Analysis of cost of cultivation of maize per hectare on the basis of cost concepts in Balrampur district. (Rs./ha)

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
	Seed cost	6768.35(15.48)	6906.44(15.46)	7446.58(16.17)	7505.00(15.61)	7020.46(15.64)
	Plant Protection	2076.94(4.75)	2107.53(4.72)	2601.62(5.65)	3241.91(6.74)	2306.17(5.14)
	Manure and fertilizer	5843.70(13.36)	5973.60(13.37)	6215.49(13.50)	6480.37(13.48)	6018.81(13.41)
1	Total material cost	14689.00(33.59)	14987.60(33.55)	16263.70(35.33)	17227.30(35.84)	15345.40(34.18)
	Family human labour	3596.74(8.22)	3297.86(7.38)	2601.62(5.65)	2416.99(5.03)	3190.65(7.11)
	Hired human labour	10075.80(23.04)	10415.40(23.32)	10914.50(23.71)	11663.00(24.26)	10497.90(23.38)
2	Total human labour	13672.5(31.27)	13713.3(30.70)	13516.1(29.36)	14080(29.29)	13688.6(30.49)
	Bullock labour	1125.00(2.57)	700.49(1.57)	0.00(0.00)	0.00(0.00)	661.14(1.47)
	Machine power	3701.50(8.46)	4624.50(10.35)	5518.62(11.98)	5896.42(12.27)	4552.44(10.14)
3	Total power cost	4826.48(11.04)	5324.99(11.92)	5518.62(11.99)	5896.42(12.27)	5213.58(11.61)
	Irrigation charges	0.00(0.00)	0.00(0.00)	10.36(0.02)	21.19(0.04)	4.19(0.00)
	Interest on working capital	1183.65(2.71)	1229.12(2.75)	1307.87(2.84)	1391.47(2.89)	1242.28(2.77)
A	Total variable cost	34371.70(78.60)	35254.90(78.93)	36606.30(79.51)	38595.20(80.29)	35489.90(79.06)
	Land revenue	12.00(0.03)	12.00(0.03)	12.00(0.03)	12.00(0.02)	12.00(0.03)
	Depreciation	482.65(1.10)	532.49(1.19)	551.86(1.19)	589.64(1.23)	521.36(1.16)
	Rental value of land	8333.33(19.06)	8333.33(18.66)	8333.33(18.10)	8333.33(17.34)	8333.33(18.56)
	Interest on fixed capital	529.68(1.21)	532.67(1.19)	533.83(1.16)	536.10(1.11)	532.00(1.18)
B	Total fixed cost	9357.66(21.40)	9410.5(21.07)	9431.02(20.48)	9471.07(19.70)	9398.69(20.94)
C	A+B	43729.30(100)	44665.40(100)	46037.36(100)	48066.20(100)	44888.60(100)

Note: Figures in parentheses indicates percentages.

Measures of farm profit in maize in Balrampur district.

The profitability of maize cultivation was evaluated by using various economic parameters such as a yield, cultivation costs, gross return, net return, cost of production, and input-output ratio. (In Table 2 & Figure 3). Empirical findings revealed that the net return over the total cost of maize cultivation averaged ₹38,704.30 per hectare across all farm sizes, it ranging from ₹36,717.70 to ₹44,854.80 per

hectare for marginal to large farms and this indicates economies of scale in maize production. The cost of production per quintal was ₹1,022.19, ₹1,031.77, ₹1,021.01, and ₹946.93 for marginal, small, medium, and large farms, respectively. The input-output ratio showed an increasing trend with farm size, overall it was 1:1.86. These results underscore the profitability and efficiency gains which associated with larger-scale maize farming operations.

Table 2: Economics of maize cultivation under different farms size groups in Balrampur district. (Rs./ha)

S. No.	Particulars	Farm Size				
		Marginal	Small	Medium	Large	Overall
1	Yield(q/ha)	42.78	43.29	45.09	50.76	44.16
2	Cost of cultivation (Rs./ha)	43729.30	44665.40	46037.30	48066.20	44888.60
4	Gross return (Rs./ha)	80447.00	82178.00	87464.00	92921.00	83592.90
5	Net return (Rs./ha)	36717.70	37512.60	41426.70	44854.80	38704.30
6	Cost of production (Rs./Q)	1022.19	1031.77	1021.01	946.93	1017.00
7	Input - Output ratio	1:1.83	1:1.83	1:1.89	1:1.93	1:1.86

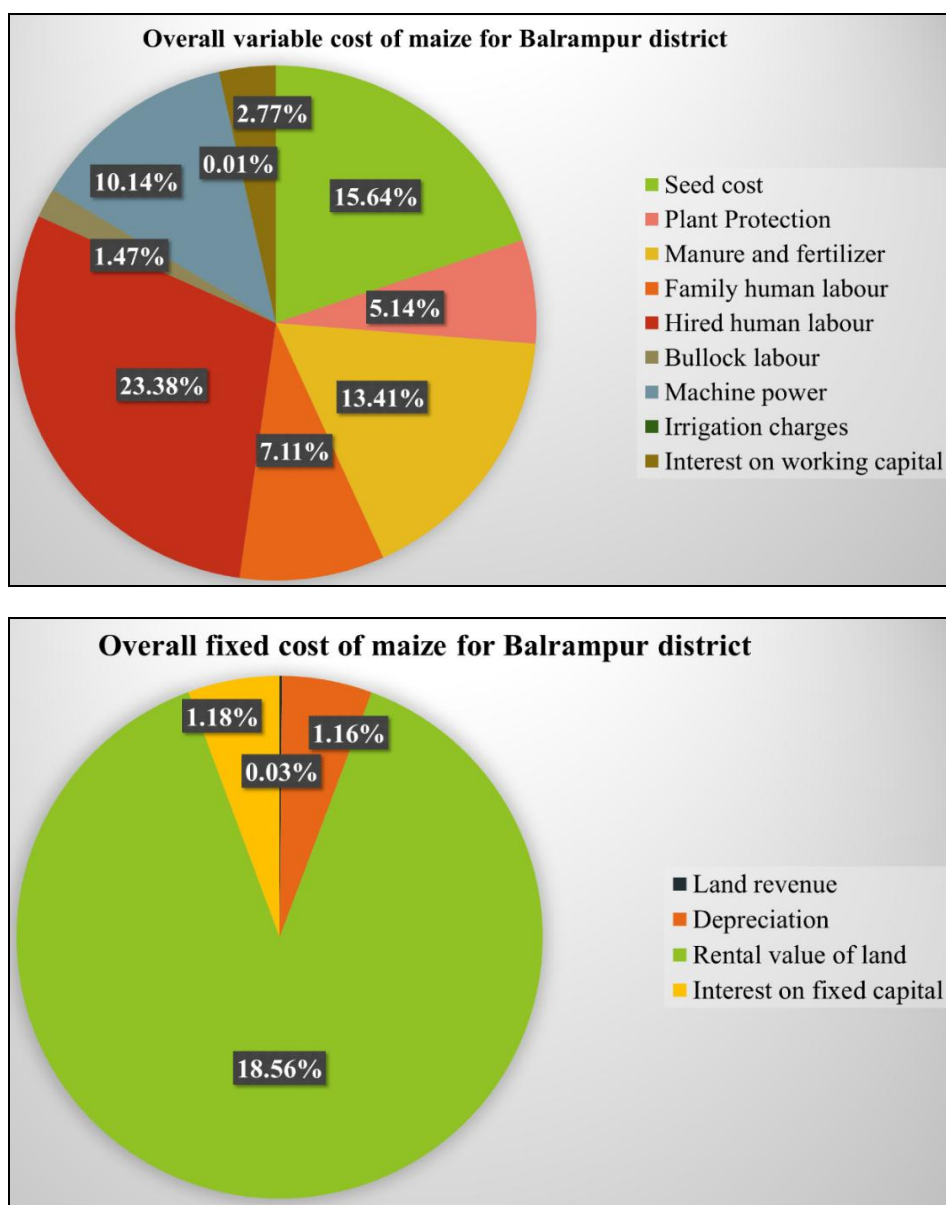


Fig 1: Overall variable and fixed cost of maize for Balrampur district.

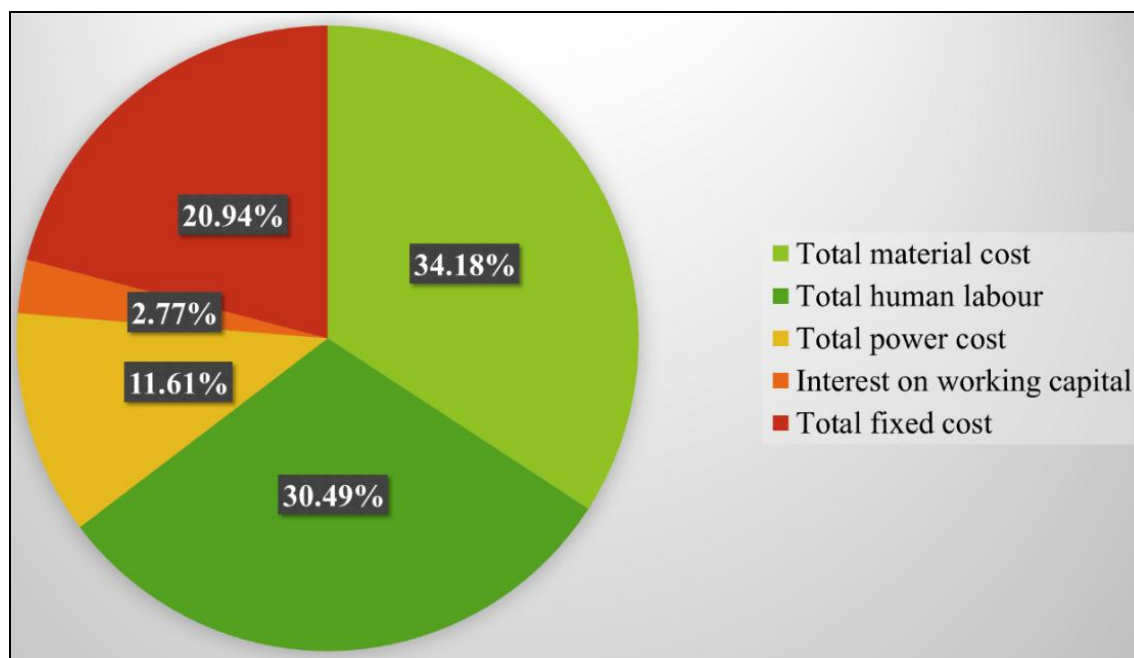


Fig 2: Cost of cultivation of maize for Balrampur district.

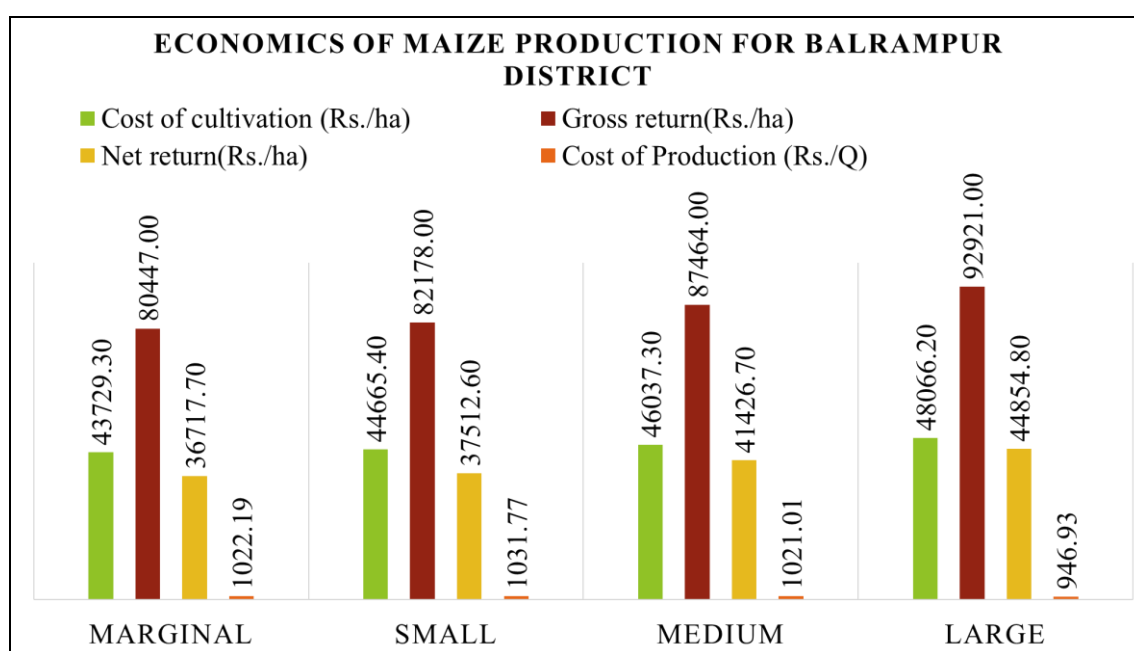


Fig 3: Economics of maize production for Balrampur district.

Cost and returns on the basis of different cost concepts of sampled households in Balrampur district.

Cost on the basis of different cost concepts of sampled households in Balrampur district.

The cost analysis based on the different cost concepts which was conducted for estimating the cost and returns associated with maize cultivation in the study area, it is presented in Table 3 According to the Commission for Agricultural Costs and Prices, Government of India, seven cost concepts are typically used. In Cost A1, includes variable costs such as land revenue and interest on working capital excluding family labor, overall it was ₹32,836.70 per hectare. The Cost A2 is identical to Cost A1 due to no leased-in or leased-out land during the study, it also amounted to

₹32,836.70 per hectare. In Cost B1, which adds interest on the value of owned capital assets (excluding land), the figure stood at ₹34,320.80 per hectare. The Cost B2, incorporating Cost B1 plus the rental value of owned land, which was ₹42,654.20 per hectare. Under Cost C1 extended Cost B1 with the imputed value of family labor, resulting in ₹37,511.50 per hectare. In Cost C2, including the imputed value of family labor in Cost B2, it was ₹45,844.80 per hectare. Finally, Cost C3, which added 10% for management input to Cost C2, which are ₹50,429.30 per hectare. These cost concepts provide a comprehensive view of the different components contributing to the total cost of maize cultivation in the study area.

Table 3: Break-up of total cost according to cost concepts in Balrampur district. (₹/ha)

Farm Size	Marginal	Small	Medium	Large	Overall
Cost A ₁	31269.58	32501.6	34578.9	36801	32836.7
Cost A ₂	31269.6	32501.6	34578.9	36801	32836.7
Cost B ₁	31799.3	33034.3	35112.7	37337.1	34320.8
Cost B ₂	40132.6	41367.6	43446.1	45670.5	42654.2
Cost C ₁	35396	36332.1	37714.4	39754.1	37511.5
Cost C ₂	43729.3	44665.5	46047.7	48087.4	45844.8
Cost C ₃	48102.26	49132	50652.5	52896.2	50429.3

Return obtained over different costs of sampled households in Balrampur district.

The returns obtained over different costs of maize on sample farms in the study area are presented in Table 4. These returns, calculated by subtracting costs A₁, A₂, B₁, B₂, C₁, C₂, and C₃ from the gross return of maize, are as follows:

₹50,756.10 for A₁ and A₂, ₹50,224.10 for B₁, ₹41,890.70 for B₂, ₹47,033.40 for C₁, ₹38,700.10 for C₂, and ₹34,210.80 for C₃ per hectare. These figures illustrate the profitability achieved after accounting for various cost components associated with maize cultivation in the study area.

Table 4: Return obtained over different costs in Balrampur district.

Farm Size	Marginal	Small	Medium	Large	Overall
Return over cost A ₁	49177.4	49676.4	52885.1	56120	50756.1
Return over cost A ₂	49177.4	49676.4	52885.1	56120	50756.1
Return over cost B ₁	48647.7	49143.7	52351.3	55583.9	50224.1
Return over cost B ₂	40314.4	40810.4	44017.9	47250.5	41890.7
Return over cost C ₁	45051	45845.9	49749.6	53166.9	47033.4
Return over cost C ₂	36717.7	37512.5	41416.3	44833.6	38700.1
Return over cost C ₃	32344.7	33046	36811.5	40024.8	34210.8

Suggestions for further improvement

- **Promotion of Mechanization and Efficient Labor Use:** Given the high labor costs, introducing mechanization, especially for medium and large farms, can reduce human labor dependency and lower production costs. Providing subsidies or access to machinery on rent could help smaller farmers as well.
- **Improved Input Management and Cost Reduction:** Educating farmers about judicious use of fertilizers and high-quality seeds can improve yield while keeping costs in check. Integrated nutrient management (INM) and soil testing for targeted fertilizer application could reduce excess expenditure on inputs like fertilizers and manure.
- **Enhanced Market Linkages and Access to Credit:** Farmers should be linked to better markets for maize to secure fair prices and avoid price volatility. Additionally, improving access to affordable credit and crop insurance could help farmers manage risks and reinvest in better farming practices.
- **Encouragement of Crop Diversification and Sustainability:** Encouraging maize farmers to diversify their crops or adopt agroforestry practices could help increase farm income, reduce dependency on one crop, and improve soil health. Furthermore, adopting climate-smart agricultural practices (e.g., water conservation, drought-resistant varieties) would enhance long-term sustainability and profitability.

and profit measures in Auriya district of Western U.P., India. *Int J Curr Microbiol Appl Sci.* 2018;7:3283-3286.

3. Lyngkhohi DR, Bera BK, Chatterjee S. Economic analysis of production of maize in Meghalaya and constraints associated with it. *Econ Aff.* 2021;66(3):395-399.
4. Muramatti G, Mishra SN, Dash A, Mohapatra B, Sarangi KK. Economic analysis of cost, returns and profitability of maize in Karnataka State. *Biol Forum Int J.* 2023;15(1):694-697.
5. Satapathy A, Prusty AK, Rout DS, Taranika PR, Rout S, Satapathy A. Cost of cultivation and income analysis of hybrid maize cultivation in Nabarangpur district of Odisha. *Int J Curr Microbiol Appl Sci.* 2020;11:1540-1548.
6. Srikanth B, Kausadikar HH, Jondhale RN, Gandhi N. Economic analysis of maize production and marketing in Khammam district, Telangana. *Asian J Agric Ext Econ Sociol.* 2017;20(4):1-13.

Reference

1. Kathirvel N, Karthika R. Cost and returns of maize cultivation in Tirupur district. *GJRA - Global Journal for Research Analysis.* 2015;4(5).
2. Singh KK, Sisodia B, Singh GP, Singh RA, Gautam NS, Tripathi S. Maize: a study on cost of cultivation