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An economic analysis of production and marketing of hybrid maize in Gariyaband district of Chhattisgarh

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Abstract

The study conducted "an economic analysis of production and marketing of hybrid maize in Gariyaband district of Chhattisgarh". The field level primary data were collected from randomly selected 70 maize growers of 3 villages of Mainpur block of Gariyaband district for the agricultural year 2021-22. The average family member was 2.45. Average cropping intensity was observed to be 178.33 per cent in the area. The distribution of average farm size of sampled hybrid maize grower in Gariyaband district was 0.71, 1.65, 2.75, and 4.94 hectares area at marginal, small, medium and large farmers, respectively. Overall average cost of cultivation of hybrid maize was found to be 29731.31 per hectare. The cost of cultivation per hectare showed increasing trend with respect to the farm size of holdings. On an overall basis input-output ratio in hybrid maize cultivation was 1:2.35. On an overall basis net return in hybrid maize cultivation was Rs. 69723.94 per hectare. The average yield of hybrid maize in the study area was 52.28 quintal per hectare. The average income over seven costs was calculated as Cost A₁ Rs. 86217.89, Cost A₂ Rs. 86217.89 Cost B₁ Rs. 85450.64, Cost B₂ Rs. 32169.18, Cost C₁ Rs. 81532.78, Cost C₂ Rs. 69733.94 and Cost C₃ Rs. 66761.81 respectively.

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

Introduction

Maize (*Zea mays* L) is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions. Globally, maize is known as queen of cereals because it has the highest genetic yield potential among the cereals. It is cultivated on nearly 150 m ha in about 160 countries having wider diversity of soil, climate, biodiversity and management practices that contributes 36% (782 m/t) in the global grain production. The United States of America (USA) is the largest producer of maize contributes nearly 35% of the total production in the world and maize is the driver of the US economy. The USA has the highest productivity (> 9.6 t/ha⁻¹) which is double than the global average (4.92 t/ha⁻¹). The average productivity in India is 2.43 t/ha⁻¹. In India, maize is the third most important food crops after rice and wheat. According to advance estimate its production is likely to be 31.51 M Tonnes (2020-21) mainly during Kharif season which covers 80% area. Maize in India, contributes nearly 9% in the national food basket. Chhattisgarh is expecting Maize crop output of nearly 7.45 lakh metric tonnes this year, officials stated. About 40 per cent of the Maize production comes from Kondagaon, Kanker and Bastar districts in the State. A reasonably favorable crop output is also expected from Surguja division this year, officials stated. In view of enormous prospect of promoting food processing units using Maize as raw material, the Chhattisgarh government signed Memorandum of Understanding (MoU) with three companies mainly- BMD Starch Pvt Ltd., Kakkad Udyog ltd and Indian Agro and Food Industries recently.

Methodology

Sampling technique of Gariyaband 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 Gariyaband 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:-

1. Value of hired human labour (permanent and casual)
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Value of owned machinery
5. Hired machinery charged
6. Value of fertilizers
7. Value of manure (produced on farm and purchased)
8. Value of seed (both farm-produced and purchased)
9. Value of insecticides and fungicides.
10. Irrigation charges (both of the owned and hired tube wells, pumping sets etc.)
11. canal-water charges
12. Land revenue, cesses and other taxes
13. Depreciation on farm implements (both of the bullock drawn and worked with human labour)
14. Depreciation on farm building, farm machinery.
15. Interest on the working capital.
16. 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, Net income = Gross income - Total expenses

Input – output ratio

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

Input - Output Ratio = Value of output / Value of input used

Results and Discussion

Cost of cultivation of hybrid maize

The cost of cultivation of hybrid maize is essential to understand that how much cost incurred for different inputs and whether farmers are receiving the enough profit or not. It is therefore, it reveals that is costs and return of hybrid maize cultivation was estimated in Rs./ha., which is given in the total cost of cultivation of hybrid maize of sampled farms was Rs. 29731.31 per hectare in which the share of total variable cost was Rs. 16885.83 per hectare followed by fixed cost Rs. 12845.48 per hectare. The share of total human labour cost was maximum (7257.38 Rs/ha) followed by total material cost (4643.12 Rs/ha). Total power cost (4221.24 Rs/ha) and interest on working capital was (512.46 Rs/ha) respectively (figure). In materials cost seed was (1083.75 Rs/ha) and manure and fertilizer (2474.25). The share of hired labour cost which was comparatively more than that of family labour cost which was found to be (3339.52 Rs/ha) and (3917.86 Rs/ha) of hired and family human labour cost. The machine power was found to be (3895.97 Rs/ha) while use of bullock power was only (325.28 Rs/ha) to the total variable cost.

The total fixed cost accounted (12845.48 Rs/ha) to total cost of cultivation irrespective to the farm size of holdings. The total fixed cost with respect to the farm size of holdings was gradually decreasing which reflects the scale to economy is worked. The evidences indicate that rental value of land was the major fixed cost and showed (11798.85 Rs/ha). The total cost of cultivation of hybrid maize was increasing with respect to farm size and was found maximum under large farms being Rs 32692.24 per hectare and minimum in marginal farms being Rs. 26822.03 per hectare. It is important to note that total variable cost was increasing with respect to the farm size. Thus, it could be concluded that total cost of cultivation of hybrid maize in study area was increasing with respect to farm size holding because large farmers could incur more expenditure on the material inputs.

Table 1: Analysis of cost of cultivation of hybrid maize per hectare on the basis of cost concept (Rs./ ha.)

S. No.	Particular	Marginal	Small	Medium	Large	Overall
A.	Variable cost					
1.	Human labour					
a.	Family labour	3955.64	4029.07	4010.37	3676.36	3917.86
		14.75	14.29	13.13	11.25	13.18
b.	Hired labour	2387.58	2799.86	3715.26	4455.39	3339.52
		8.90	9.93	12.12	13.63	11.23
	Total human labour cost	6343.22	6828.93	7725.63	8131.75	7257.38
		23.65	24.21	25.30	24.87	24.41
2.	Power use cost					
a.	Bullock	750.52	550.58	0.00	0.00	325.28
		2.80	1.95	0.00	0.00	1.09
b.	Machine power	3500.00	3609.17	4025.50	4449.20	3895.97
		13.05	12.80	13.18	13.61	13.10
	Total power use cost	4250.52	4159.75	4025.50	4449.20	4221.24
		15.85	14.75	13.18	13.61	14.20
3.	Seed	1016.00	1046.00	1120.00	1153.00	1083.75
		3.79	3.71	3.67	3.53	3.65
4.	Manure & fertilizes	1308.00	2351.97	2871.02	3366.00	2474.25

		4.88	8.34	9.40	10.30	8.32
5.	Plant protection	315.38	613.71	850.50	1170.95	737.64
		1.18	2.18	2.79	3.58	2.48
6.	Irrigation charge	294.11	320.73	376.92	398.14	347.48
		1.10	1.14	1.23	1.22	1.17
7.	Miscellaneous cost	150.00	200.00	250.00	300.00	251.64
		0.56	0.71	0.82	0.92	0.85
8.	Interest on working capital	409.80	500.94	563.08	576.01	512.46
		1.53	1.78	1.84	1.76	1.72
	Total variable cost	14087.03	15456.32	17782.65	19545.05	16885.83
B.	Fixed capital					
9.	Land revenue	10.00	10.00	10.00	10.00	10.00
		0.04	0.04	0.04	0.04	0.04
10.	Depreciation	265.00	270.00	269.97	272.57	269.39
		0.99	0.96	0.88	0.83	0.91
11.	Interest on fixed capital	750.00	755.00	754.00	810.00	767.25
		2.80	2.68	2.47	2.48	2.58
13.	Rental value of owned land	11710.00	11712.56	11718.20	12054.62	11798.85
		43.66	41.53	38.38	36.87	39.68
	Total fixed cost	12735.00	12747.56	12752.17	13147.19	12845.48
		47.48	45.20	41.76	40.22	43.21
C.	Total cost (A+B)	26822.03	28203.88	30534.82	32692.24	29731.31
		100.00	100.00	100.00	100.00	100.00

Measures of farm profit of hybrid maize

The measures of farm profit of hybrid maize cultivation has been worked out by considering the economic parameters viz; yield of hybrid maize, cost of cultivation, gross return, cost of production, input – output ratio, which is presented in table 2. It has been observed from empirical findings that net return over total cost of cultivation of hybrid maize was Rs. 69723.94 per hectare, irrespective to the farm size holding

and it was vary from Rs. 65402.97 to 72967.76 per hectare for marginal to large farm size. It is being observed that returns to scale was operating in hybrid maize cultivation. The per quintal cost of production was found to be 553.03, 548.18, 569.15, and 589.05 for marginal, small, medium, and large farm size, respectively, while input – output ratio showing increasing trend with respect to farm size. Overall input-output ratio was found to be 1:2.35 respectively.

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

Particulars	Marginal	Small	Medium	Large	overall
Yield (qt/ha)	48.50	51.45	53.65	55.50	52.28
Cost of cultivation (Rs/ha)	26822.03	28203.88	30534.82	32692.24	29731.31
Gross return (Rs/ha)	92225.00	97846.50	102089.50	105660.00	99455.25
Net return (Rs/ha)	65402.97	69642.62	71554.68	72967.76	69723.94
Cost of production (Rs/ha)	553.03	548.18	569.15	589.05	538.54
Input – output ratio	1:2.44	1:2.47	1:2.34	1:2.23	1:2.35

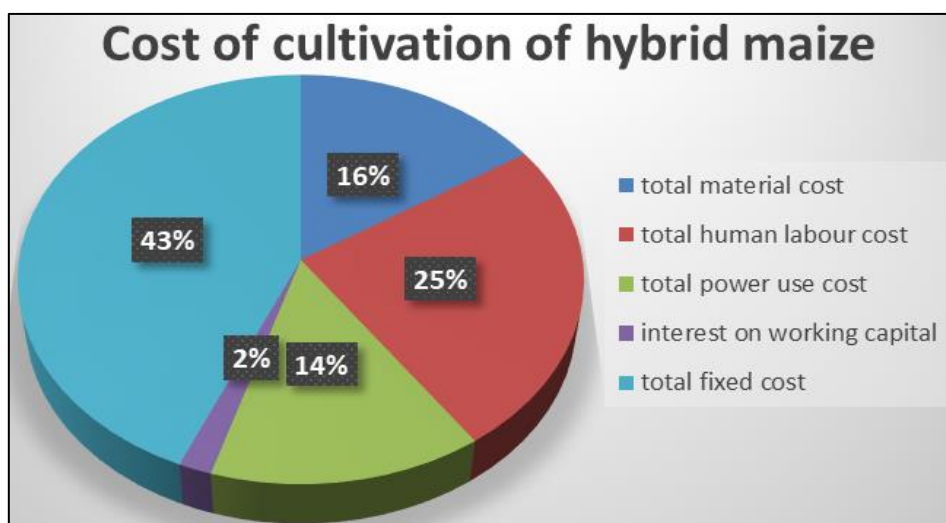


Fig 1: Cost of cultivation of hybrid maize

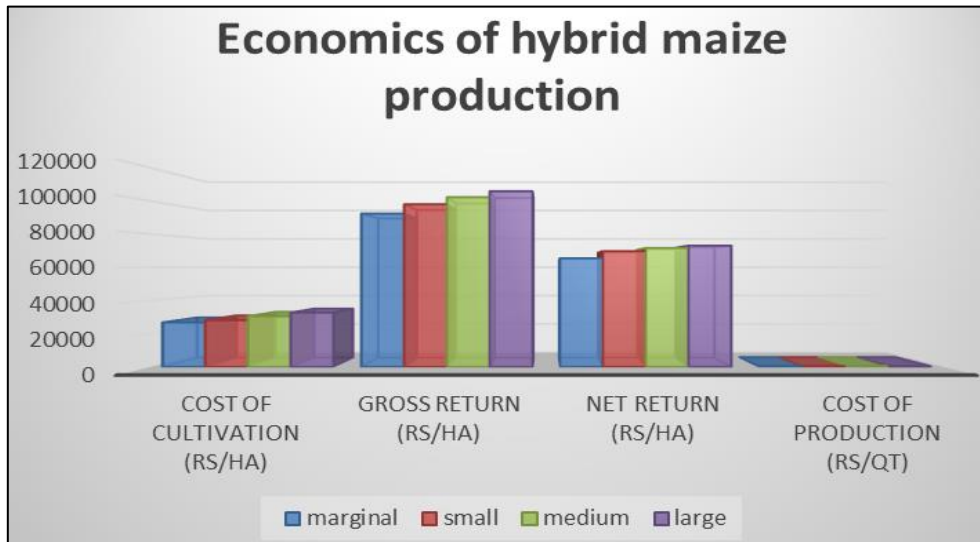


Fig 2: Economics of hybrid maize production

Cost on the basis of different cost concept

Generally, 7 cost concepts used for estimation of costs and return by CACP, Government of India. Cost of cultivation of hybrid maize of sample farms in the study area has been worked out and presented in table 3. Is evident from the cost A₁ which is designated as the variable cost including land revenue and interest on working capital and excluding family labour was found to be Rs. 13237.36. Per hectare on overall basis, which was added with rent paid for lease in land and dignified with cost A₂ which was found to be Rs. 13237.36 Per hectare which is same as cost A₁ there was no any case for

leased in and leased out of land during course of investigation. Cost B₁ is cost A₁ added with interest on value of owned capitals assets (excluding land) which was found to be Rs. 14004.61 per hectare. Cost B₂ is cost B₁ added with rental value of owned land which was found to be Rs. 25803.45 per hectare. Cost C₁ is cost B₁ added with imputed value of family labour which was Rs. 17922.47 per hectare. Cost C₂ is cost B₂ added with imputed value of family labour which is Rs.29721.31 per hectare. Cost C₃ is cost C₂ included with value of management input at 10 per cent of cost C₂ which is Rs. 32693.44 per hectare.

Table 3: Break-up of total cost according to cost concept (Rs. /ha.)

Particulars	Marginal	Small	Medium	Large	overall
Cost A ₁	10396.39	11697.25	14042.25	16141.26	13237.36
Cost A ₂	10396.39	11697.25	14042.25	16141.26	13237.36
Cost B ₁	11146.39	12452.25	14796.25	16951.26	14004.61
Cost B ₂	22856.39	24164.81	26514.45	29005.88	25803.45
Cost C ₁	15102.03	16481.32	18806.62	20627.62	17922.47
Cost C ₂	26812.03	28193.88	30524.82	32682.24	29721.31
Cost C ₃	29493.23	31013.26	33577.30	35950.46	32693.44

Return obtained over different costs

Return obtained over different costs of hybrid maize on sample farms in the study area has been worked out and

presented in table 4. The return over cost A₁, A₂, B₁, B₂, C₁, C₂ and C₃ is Rs. 86217.89, 86217.89, 85450.64, 32169.18, 81532.78, 69733.94, 66761.81per hectare respectively.

Table 4: Return obtained over different costs (Rs/ha)

Particulars	Marginal	Small	Medium	Large	Overall
Return over cost A ₁	81828.61	86149.25	88047.25	89518.74	86217.89
Return over cost A ₂	81828.61	86149.25	88047.25	89518.74	86217.89
Return over cost B ₁	81078.61	85394.25	87293.25	88708.74	85450.64
Return over cost B ₂	69368.61	34099.65	31379.92	30830.7	32169.18
Return over cost C ₁	77122.97	81365.18	83282.88	85032.38	81532.78
Return over cost C ₂	65412.97	69652.62	71564.68	72977.76	69733.94
Return over cost C ₃	62731.77	66833.24	68512.20	69709.54	66761.81

Suggestions for further improvement

The empirical findings of study envisaged the maize growers still growing the traditional variety of maize which low yield potential. Therefore it is being suggested that extension workers should come forward to aware the maize growers to grow improved or high yielding variety or hybrid. To increase maize production, the government should arrange for the timely supply of quality seeds and other inputs at reasonable

prices for maize growers.

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