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## Costs and returns in zero budget natural farming vis-à-vis Conventional farming in Paddy crop in Kurnool district of Andhra Pradesh

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### Abstract

The study is based on comparative economics of Zero budget natural farming VS Conventional farming in paddy crop rice in Kurnool district of Andhra Pradesh. The primary data related to cost and returns of paddy crop was collected from 120 paddy farmers of six villages of Kurnool district using Random Sampling technique. The objective of the study was to compare the costs and returns in both the methods of farming in Paddy. The results revealed that the per hectare cost of cultivation was less in ZBNF method as compared to Conventional method i.e., Rs. 76633.64 and Rs. 82760.22, respectively. The gross value observed in ZBNF method was Rs. 125575.46 which was more compared to that of conventional method i.e., Rs.115548.98. The average benefit cost ratio was estimated to be 1.64 in ZBNF method and 1.40 in Conventional method. It can be concluded that ZBNF method was profitable than Conventional method.

**Keywords:** Rice production, cost concepts, profitability, benefit-cost ratio

### Introduction

Paddy (*Oryza Sativa* L.) is the second leading cereal crop and for 50% of global population it is the major staple food. Globally, in around 162.06 million hectares of land paddy is cultivated in the year 2019. The United States Department of Agriculture (USDA) estimates that the world rice production in 2020-2021 would be 503.17 million metric tons, nearly 1.97 million tons more than previous month's production. Paddy is one of the principal food crops and is the chief grains of India. During the year 2019-20 total production of rice is estimated at a record of 117.47million tonnes in India. It has improved by 9.67 million tonnes than the five years' average production of 107.80 million tonnes. Andhra Pradesh state based on its resources is considered as the fourth largest producer of paddy in India and about one fourth of the total cropped area of the state is under paddy cultivation (Telu Visalakshi, 2015).

### Methodology

The sampling design opted for the analysis was two stage purposive sampling which includes a primary unit of sampling i.e., sample tehsil and the secondary unit of sampling is village. Based on the maximum area under paddy, three villages each from Nandyal and Allagadda tehsils in Kurnool district were selected. As per the information obtained from the village revenue office the list of paddy farmers including their operational area and area under paddy cultivation. Stratified random sampling technique was adopted to obtain separate list of paddy farmer from each village. From each village 10 ZBNF farmers and 10 Conventional farmers were selected which constituted a total sample size of 120 including 60 ZBNF farmers and 60 Conventional farmers. The costs and returns were estimated using different cost concepts.

### Cost concept

The first objective of the study on cost and returns in paddy production will be completed by analyzing the data using standard cost concepts generally followed in farm management studies i.e., Cost-A, Cost-B and Cost-C with the help of tabular analysis.

**Cost A:** It includes the costs of hired human labour, bullock labour (hired and owned), seeds (home produced and purchased), manures (owned and purchased), fertilizers, plant protection measures, machinery charges, land revenue and other cesses, interest on working capital, depreciation on implements and machinery, repairs of machineries and irrigation charges etc.,

**Cost B:** Rental value of owned land and interest on fixed capital represent the imputed cost which is added to the Cost 'A'. Thus,

Cost 'B' = Cost 'A' + Rental value of land + Interest on fixed capital.

**Cost C:** It is the total cost of production, which included all the costs items (actual as well as imputed). The imputed value of family labours was added to cost 'B' to work out cost 'C'. Thus, Cost 'C' = Cost 'B' + Imputed value of family labour.

### Profitability concepts

Total production: Main produce and by produce.

Gross returns = Value of main produce + value of by produce

Family labour income = Gross returns – Cost B

Net returns = Gross returns – Cost C

Benefit cost ratio: B.C.R. = Gross income / Total cost.

## Result and Discussion

### Cost of cultivation

The standard cost concept method was adopted by Dhurve *et al.* (2019) [2] for estimating the per hectare cost of cultivation. In table 1 it is observed that the total per hectare cost of cultivation i.e., Cost 'C' in zbnf method, conventional method and at overall level was Rs.76633.64, Rs.82760.22, Rs.79696.93 which comprised of Cost 'A' i.e., Rs.36735.75, Rs.42439.24, Rs.39587.50 and Cost 'B' i.e., Rs.75898.07,

Rs.82086.61, Rs.78992.34 in zbnf method, conventional method and at overall level respectively.

Among the different items of costs, at overall level, the rental value of land was the major cost i.e., Rs.19940.33 (24.09%) followed by interest on fixed capital Rs.19464.52 (23.52%), depreciation charges Rs.10954.83 (13.08%), hired male labour Rs.8577.68(10.80%), machine power Rs.6628.08(8.35%), hired female labour Rs.4257.09(5.36%), seed Rs.2610.52(3.29%), manure Rs.1799.50 (2.23%), fertilizer cost Rs.1030.28 (1.30%), micro nutrient charges Rs.529.83 (0.67%), plant protection chemicals/biocides Rs.784.45 (0.99%), family male labour Rs.412.90 (0.50%), incidental charges Rs.307.55 (0.39%), family female labour Rs.291.70 (0.35%), irrigation Rs.253.70(0.32%), repairs Rs.239.50 (0.30%), land revenue Rs.151.46 (0.19%).

The average yield of main produce in zbnf paddy cultivation i.e., 64.81 qtl was more than the yield of main produce in conventional method i.e., 61.84 qtl. The per quintal cost under zbnf method was less than conventional method of paddy cultivation i.e., Rs.1074.38 and Rs.1212.75/ha respectively. From the estimated results, it can be concluded that the costs incurred by farmers adopting zbnf method were less than the costs attained by conventional farmers. Devi, K. S. and Ponnarasi, T (2009) [1] estimate the cost and returns of paddy in the System of Rice Intensification and their comparison with those in conventional method.

**Table 1:** Average per hectare cost of cultivation of paddy (Rupees)

Sr. No.	Particulars	ZBNF	Conventional	Overall
1	Hired male labour	8111.01 (10.21)	9044.35 (11.39)	8577.68 (10.80)
	Hired female labour	4105.37 (5.17)	4408.81 (5.55)	4257.09 (5.36)
	Total	12216.38 (15.38)	13453.16 (16.94)	12834.77 (16.16)
2	Bullock power	-	-	-
3	Machine power	6418.66 (8.08)	6837.50 (8.61)	6628.08 (8.35)
4	Seed	2602.16 (3.28)	2618.89 (3.30)	2610.52 (3.29)
5	Manure	2026.00 (2.51)	1573.00 (1.95)	1799.50 (2.23)
6	Natural Fertilizers/Chemical Fertilizers cost	337.00 (0.42)	1723.57 (2.17)	1030.28 (1.30)
7	Irrigation	255.83 (0.32)	251.58 (0.32)	253.70 (0.32)
8	Plant PC/ Biocides	318.40 (0.40)	1250.50 (1.57)	784.45 (0.99)
9	Micronutrient charges	-	1059.66 (1.33)	529.83 (0.67)
10	Incidental Charges	320.00 (0.40)	295.11 (0.37)	307.55 (0.39)
11	Repairs	240 (0.30)	239.01 (0.30)	239.50 (0.30)
12	Working Capital (1 - 12)	23908.43 (30.11)	28719.21 (36.17)	26313.85 (33.14)
13	Interest on W.C.	1434.5 (1.81)	1723.15 (2.17)	1578.825 (1.99)
14	Depreciation charge	11222.62 (14.13)	10687.04 (13.46)	10954.83 (13.80)
15	Land revenue	150.22 (0.19)	152.10 (0.19)	151.46 (0.19)
16	Cost A (12 -15)	36735.75 (45.48)	42439.24 (52.54)	39587.50 (49.01)
17	Rental value of land	20779.02 (25.11)	19101.64 (23.08)	19940.33 (24.09)
18	Interest on fixed capital	18383.3 (22.21)	20545.73 (24.83)	19464.52 (23.52)
19	Cost B (16-18)	75898.07 (91.71)	82086.61 (99.19)	78992.34 (95.45)
20	Family male labour	435.31 (0.53)	390.48 (0.47)	412.90 (0.50)
21	Family female labour	300.26 (0.36)	283.13 (0.34)	291.70 (0.35)
22	Total	735.57 (0.89)	673.61 (0.81)	704.59 (0.85)
23	Cost C (19+22)	76633.64 (100.00)	82760.22 (100.00)	79696.93 (100.00)
	Main produce yield(qtl)	64.81	61.84	63.32
	Value of main produce	116822.66	107785.33	112304.00
	By-produce yield(qtl)	31.26	28.17	29.72
	Value of by-produce	8752.80	7763.65	71438.71
	Gross Value	125575.46	115548.98	120562.22
	Per quintal Cost	1047.38	1212.75	1130.07

**Table 2:** Per hectare profitability of paddy crop (Rupees)

Sr. No.	Particulars	ZBNF	Conventional	Overall
1	Gross returns	125575.46	115548.98	120562.22
2	<b>Costs (Rs.)</b>			
	i) Cost A	36735.75	42439.24	39587.50
	ii) Cost B	75898.07	82086.61	78992.34
	iii) Cost C	76633.64	82760.22	79696.93
3	<b>Profit (Rs.)</b>			
	i) Cost A	88839.71	73109.74	80974.73
	ii) Cost B	49677.39	33462.37	41569.88
	iii) Cost C	48941.82	32788.76	40865.29
4	Benefit - Cost ratio	1.64	1.40	1.52

It is revealed that the per ha gross returns in zbnf method was higher than conventional method i.e., Rs.125575.46 and Rs.115548.98 respectively. At overall level the gross returns in paddy cultivation were Rs.120562.22/ha. The per ha profit at cost 'c' was more in zbnf method i.e., Rs.48941.82 than conventional method i.e., Rs. 32788.76 and at overall level it was Rs.40865.29. The benefit-cost ratio was 1.64, 1.40 and 1.52 in zbnf method, conventional method and at overall level respectively. Sarita *et al.* (2018) <sup>[9]</sup> had worked out different measures of farm profitability where the average input and output ratio was found to be 1:1.66. It was observed that the benefit cost ratio was more than unity in both methods which declares that paddy cultivation is viable. The benefit cost ratio of zbnf method of paddy cultivation is higher than conventional method.

### Conclusion

The per hectare Cost A, B and C in zbnf and conventional method were Rs.36735.75, Rs.75898.07, Rs.76633.64 and Rs.42439.24, Rs.82086.61, Rs.82760.22, respectively.

The gross returns obtained in zbnf method i.e., Rs.125575.46/ha were higher than conventional method i.e., Rs.115548.98/ha.

The benefit-cost ratio of zbnf method was 1.67 which was greater than the ratio of conventional method. Hence, zero budget farming is profitable, had been proved.

### Policy Implication

The adoption of zero budget natural farming showed higher gross returns and B:C ratio more than that in conventional method of farming which implies that intensifying the awareness of zbnf method by conducting extension programmes would be helpful.

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