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# Economics of Paddy Cultivation in East Godavari district of Andhra Pradesh

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## Abstract

This study examined the yield, input use, net returns, break-even output and resource use efficiency in paddy cultivation in East Godavari district of Andhra Pradesh. At district level, total variable cost per hectare was Rs.65160.22 whereas total cost of cultivation per hectare was Rs.97884.09. Total variable cost accounts for 66.57% to the total cost. Labour cost constitutes over 63% of the total variable cost. At district level, total returns from paddy crop were Rs.79394.81 per hectare. Returns over variable cost were positive but returns over total cost? were negative. It is observed that the actual yield was less than BEO. Cobb-Douglas production function estimation revealed that, except for manures and fertilisers, all other inputs were positively contributing to productivity. Among these, land and labour variables were significant. Keeping in view the recent proposal by the Government to fix MSP at 1.5 times of total expenses incurred by farmers, BEO simulations has been carried out under different scenarios. The results indicate that that proposed hike in MSP can improve viability of paddy cultivation provided the increase is based on cost of cultivation in the region and there is effective enforcement of MSP.

**Key words:** BEO, MSP, Rice, Paddy, East Godavari, Crop-holiday

## Introduction

Reiterating the current government's commitment to the goal of doubling farmers' income by 2022, in the Union Budget 2018, the government has announced its decision to offer a Minimum Support Price (MSP) of at least 1.5 times the expenses borne by farmers for all crops. In this backdrop, in the present study an attempt has been made to evaluate economics of paddy cultivation in East Godavari district of Andhra Pradesh.

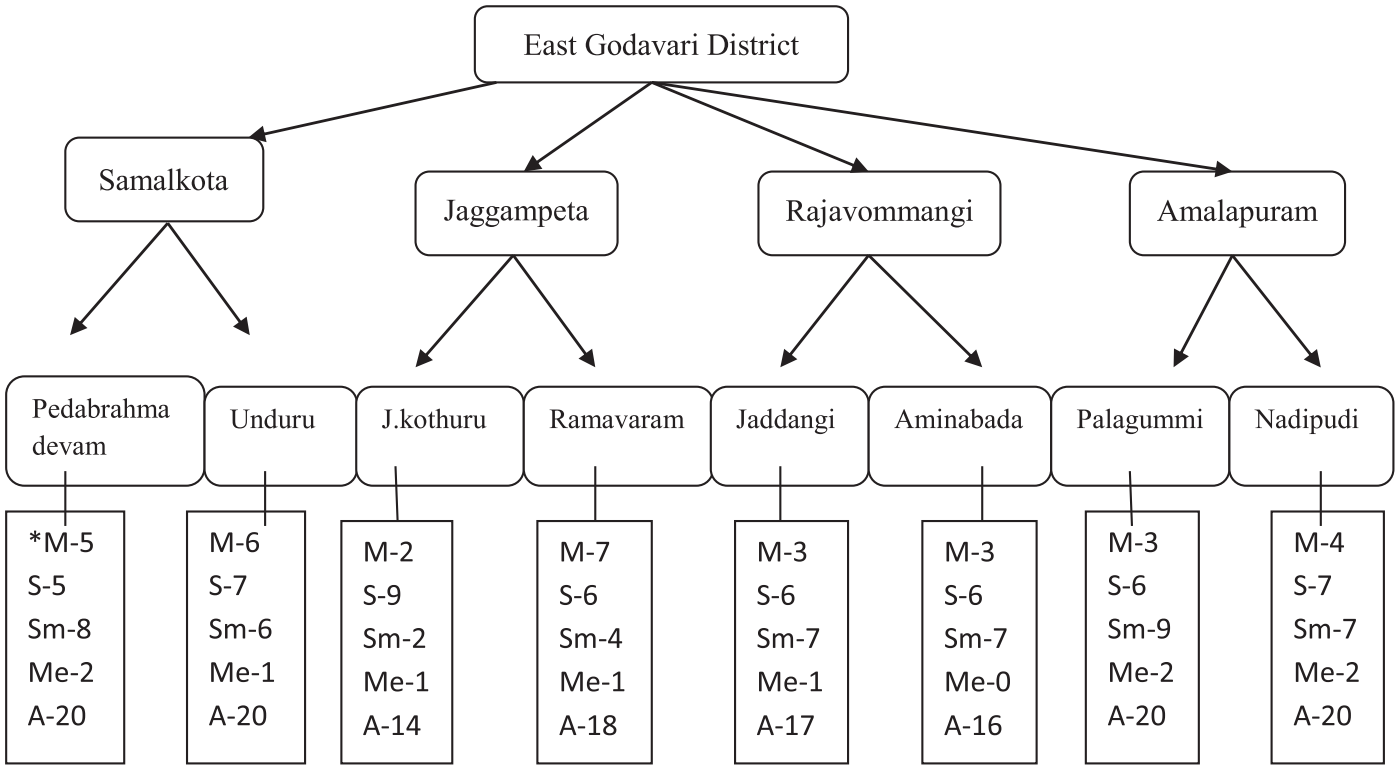
In A.P, within agricultural crops sector, major share of Gross Value Added (GVA) was contributed by paddy, but its share declined to 9% in 2015-16 compared to 11% in 2014-15. East Godavari contributed 9% of Gross sown area (GSA) and 17.67% of Paddy area in the state in 2015-16. In East Godavari, Paddy area constituted 56.22% of GSA in 2015-16. East Godavari offers an important case study not only because of its importance in contribution to rice production in the state but also because of crop holiday observed in the district in 2011-12, reflecting farmer's unhappiness with returns from paddy cultivation.

## Materials and Methods

*Sampling framework*

Keeping in view the objective of the study, a multistage sampling procedure was adopted in getting primary data from farmers. In the first stage, East Godavari district of Andhra Pradesh was purposively selected. In the second stage, four mandals namely Samalkota, Jaggampeta, Rajavommangi, Amalapuram were selected representing mandals with different pattern and levels of crop-diversification. Samalkota was low diversified mandal, Jaggampeta and Rajavommangi were highly diversified mandals and Amalapuram was medium diversified mandal. This type of mandal selection ensured capturing the contextual diversity in paddy cultivation. In the third stage, two villages from each mandal have been selected randomly. From these four mandals a total of 145 farmers were selected randomly for data collection as represented in Figure 1. Primary data was collected using specifically designed and pretested questionnaires for farmers. For further analysis paddy farmers were post stratified into marginal (<1 ha), Small (1-2 ha), semi medium (2-4 ha) and medium (4-10 ha) categories based on the size of their operational land holdings.

**Figure 1: Farmers sampling plan**




***M – Marginal farmers; S - Small farmers; Sm –Semi medium farmers; Me – Medium farmers; A – All size categories**
**Figures adjacent to different categories of farmer indicate total number of farmers in that category.**

*Analytical Framework*

From the selected farmers, data regarding expenses incurred in cultivation of paddy for the *kharif* season of the year 2015-16 was collected. Using this data, computation of cost of cultivation of paddy was carried out on hectare basis in two parts namely, variable cost and fixed cost. Variable cost includes cost of human labour, machine/ bullock labour, seed, irrigation, manures, fertilizers, pesticides, and interest on working capital. The prevailing bank rate of interest (7%) was taken to work out the interest on working capital for the duration of the crop (150 days). Items included under the category of fixed costs are land revenue, rental value of land, interest on fixed capital. Interest on fixed capital was calculated in the same way as in case of interest on working capital at bank interest rate of 10%. Returns in paddy cultivation were assessed by computing returns over variable cost and returns over total cost. Cost of production was worked out as cost per unit of output i.e. per quintal of paddy and compared with output price realized by farmers.

For assessing viability of paddy cultivation, Break even analysis was carried out. Break even output (BEO) is the output level at which the total revenue received by a farmer just matches the total cost incurred. It is computed at hectare level using the formula

$$\text{Break even output (units)} = \frac{\text{Fixed cost}}{\text{Price per unit-Variable cost per unit}}$$

BEO was compared with actual yield realised.

Cobb-Douglas production function was estimated to find out whether farmers used various inputs in crop production efficiently. Cobb-Douglas production function in linear form was specified as

$$\text{Log } Y = \log A + b_1 \log X_1 + b_2 \log X_2 + b_3 \log X_3 + b_4 \log X_4 + b5 \log X_5 + b_6 \log X_6 + b_7 X_7$$

Where, Y = Rice yield (quintals/farm)

A – Constant (intercept)

$X_1$- Land in acres

$X_2$- No. of human labour days

$X_3$- Seed cost (Rs.)

$X_4$- No. of tractor hours

$X_5$- Manures and Fertilizers (Rs.)

$X_6$- Other expenses (Rs.)

$X_7$- dummy 1 for leased in farmers, otherwise 0.

$b_1$, $b_2$, $b_3$, $b_4$, $b_5$, $b_6$, $b_7$ - elasticity coefficients

The elasticity coefficients obtained in estimation in turn have been used to calculate their marginal value product (MVP) at their geometric mean for an average farm.

$$MPP = E \times \frac{\overline{Y}}{\overline{X}}$$

Where, MPP= Marginal physical product

E= Elasticity's of production

$\overline{Y}$ = Geometric mean of yield

$\overline{X}$ = Geometric mean of a given factor

$$MVP = MPP \times Py$$

Where, Py = Price of the output

Then the marginal value product was compared with their Marginal Input Cost (MIC) for evaluating resource use efficiency.

## Results and Discussion

Salient characteristics of sampled farmers are presented in Table 1.

**Table 1: Salient characteristics of sampled farmers**

| Mandal name | Farmer category | Average total farm size (ha) | Paddy area share in total operational holding area (%) | Paddy yield (in quintals/ha) | Share of of leased-in -in farmers |
|---|---|---|---|---|---|
| Samalkota | Marginal | 0.61 | 100.00 | 58.38 | 45.45 |
| | Small | 1.38 | 100.00 | 54.94 | 58.33 |
| | Semi medium | 2.37 | 100.00 | 55.69 | 64.28 |
| | Medium | 4.05 | 100.00 | 58.05 | 66.66 |
| | **All** | **1.71** | **100.00** | **56.19** | **57.5** |
| Jaggampeta | Marginal | 0.65 | 75.81 | 59.45 | 55.55 |
| | Small | 1.44 | 57.80 | 57.83 | 66.67 |
| | Semi medium | 2.63 | 41.00 | 56.96 | 50 |
| | Medium | 5.06 | 59.98 | 59.28 | 50 |
| | **All** | **1.67** | **55.23** | **58.18** | **59.37** |
| Rajavommangi | Marginal | 0.68 | 80.20 | 57.89 | 33.33 |
| | Small | 1.35 | 64.98 | 57.21 | 50 |
| | Semi medium | 2.46 | 42.34 | 57.22 | 7.15 |
| | Medium | 4.05 | 100.00 | 59.28 | 0 |
| | **All** | **1.78** | **55.17** | **57.54** | **27.27** |
| Amalapuram | Marginal | 0.64 | 100.00 | 60.46 | 71.43 |
| | Small | 1.39 | 93.23 | 58.61 | 92.31 |
| | Semi medium | 2.81 | 95.50 | 58.90 | 75 |
| | Medium | 4.15 | 97.59 | 61.13 | 75 |
| | **All** | **2.10** | **95.67** | **59.37** | **80** |
| East Godavari district | Marginal | 0.638 | 89.449 | 59.041 | 51.52 |
| | Small | 1.392 | 77.897 | 57.097 | 67.31 |
| | Semi medium | 2.567 | 75.707 | 57.420 | 50 |
| | Medium | 4.291 | 89.627 | 59.670 | 60 |
| | **All** | **1.83** | **79.66** | **57.89** | **57.24** |

It could be seen from Table 1 that average farm size in East Godavari was 1.83 ha. In selected mandals average farm size ranged from 1.67 ha to 2.10 ha. Paddy area share in total operational holding area was 79.66% in East Godavari. In Samalkota mandal paddy area share was 100% followed by Amalapuram (95.67), whereas in other two mandals it

was 55%. Share of leased in farmers in East Godavari district was 57.24% and this ranged from 27.27% to 80% in selected mandals. Share of leased in farmers was highest in case of small farmers in all mandals except in samalkota mandal, wherein medium farmers constituted highest share of leased in farmers. At district level average paddy yield was 57.89q pl mention the unit (qtl/ha?). Across selected mandals, paddy yield ranged between 56.19 to 59.37q(qtl/ha?). Across different categories of farmers at district level, highest paddy yield was observed in the case of medium farmers (59.67q/ha) followed by marginal farmers (59.041 q/ha); semi medium farmers (57.420 q/ha) and small farmers (57.079 q/ha). These facts indicate diverse contexts of paddy cultivation in the district.

Details of Cost of cultivation of paddy per hectare are presented in Table 2. At district level, total variable cost per hectare was Rs.65160.22 which accounts for 66.57% of the total cost. Across the farmer categories variable cost was highest in case of marginal farmers (Rs.68731.95) and lowest in case of small farmers (Rs.63565.94). At aggregate level maximum variable cost was observed in case of weeding which accounted for 17.02% of variable cost, due to more human labour involvement. The second highest cost item under variable costs was post harvesting operations (please mention the operations, *viz*., threshing, bagging, transportation?? (14.82%) and transplanting (14.28%). Expenses incurred on weeding was maximum in the case of marginal, small, and semi medium categories but in case of medium farmers post harvesting cost was the highest variable cost. At aggregate level, among the components of variable cost, human labour cost constituted the highest share (63.87%) followed by manures (11.90%). Sita Devi and Ponnarasi (2009) and Archana (2013) also reported that human labour cost constituted highest share in cost of paddy cultivation. Human labour cost share ranged from 61.06 to 67.08% of variable cost across different farm size categories. Cost of seeds constituted only a small (2.78 to 3.25%) share of variable cost because most of the farmers used local varieties of seeds.

**Table 2: Cost of cultivation of Paddy (Rs. /Hectare)**

| | **Farm Size Category** | | | | |
|---|---|---|---|---|---|
| Particulars | **Marginal** | **Small** | **Semi medium** | **Medium** | **All** |
| Ploughing | 4695.66 (6.83) | 3654.93 (5.75) | 5075.85 (7.77) | 5850 (8.97) | 4802.95 (7.37) |
| Sowing | 2424.85 (3.53) | 2109.29 (3.32) | 2401.05 (3.67) | 2433.60 (3.73) | 2331.05 (3.58) |
| Manuring | 8929.18 (12.99) | 8254.60 (12.99) | 8458.72 (12.94) | 8546.20 (13.10) | 8462.07 (12.99) |
| Transplanting | 9619.72 (14.00) | 8476.17 (13.33) | 9739.00 (14.9) | 9282.00 (14.23) | 9307.14 (14.28) |
| Fertilizer application | 7258.88 (10.56) | 6107.56 (9.61) | 6440.53 (9.85) | 5957.12 (9.13) | 6336.33 (9.72) |
| Weeding | 12522.63 (18.22) | 14477.02 (22.77) | 10239.69 (15.66) | 7572.50 (11.61) | 11090.70 (17.02) |
| Irrigation | 1667.25 (2.43) | 1667.25 (2.62) | 1667.25 (2.55) | 1667.25 (2.56) | 1667.25 (2.56) |
| Application of Plant protection chemicals | 4116.67 (5.99) | 2459.36 (3.87) | 3526.03 (5.39) | 4618.90 (7.08) | 3492.71 (5.36) |
| Harvesting | 6950.53 (10.11) | 6907.49 (10.87) | 6522.86 (9.98) | 6266.00 (9.61) | 6617.10 (10.16) |
| Post harvesting costs | 9075.25 (13.20) | 8091.53 (12.73) | 9898.01 (15.14) | 11635.00 (17.84) | 9658.06 (14.82) |
| Interest on working capital | 1471.33 (2.14) | 1360.74 (2.14) | 1399.32 (2.14) | 1396.25 (2.14) | 1394.87 (2.14) |
| **Total variable cost** | 68731.95 (100) | 63565.94 (100) | 65368.31 (100) | 65224.82 (100) | 65160.22 (100) |

| | Farm Size Category | | | | |
|---|---|---|---|---|---|
| Particulars | **Marginal** | **Small** | **Semi medium** | **Medium** | **All** |
| Land revenue | 370.50 | 367.84 | 370.50 | 370.5 | 369.79 |
| Rental value of land | 29427.53 | 31382.38 | 30895.58 | 31720 | 31045.13 |
| Interest on fixed capital | 1241.58 | 1322.93 | 1302.75 | 1337.10 | 1308.95 |
| Total fixed cost | 31039.61 | 33073.15 | 32568.84 | 33427.60 | 32723.87 |
| **Total cost** | 99771.56 | 96639.09 | 97937.14 | 98652.42 | 97884.09 |
| Share of variable cost in total cost | 68.88 | 65.77 | 66.74 | 66.12 | 66.57 |
| Share of human labour cost in variable cost | 65.82 | 67.08 | 62.80 | 61.06 | 63.87 |
| Share of seed cost in variable cost | 2.78 | 2.84 | 3.23 | 3.25 | 3.09 |
| Share of manure and fertilizer cost in variable cost | 18.71 | 19.54 | 19.87 | 18.74 | 19.47 |
| Share of plant protection chemicals in variable cost | 3.72 | 2.69 | 4.13 | 5.84 | 4.03 |

Figures in parenthesis indicate percentages to total variable cost

It could be seen from Table 3 that total cost of production per quintal of paddy was Rs.1690.86 at district level and it ranged from Rs.1653.30 to Rs.1705.63 across farm size categories. As observed earlier in Table 2 weeding constituted highest variable costs of production. Total cost of cultivation (Table 2) was highest in case of marginal farmers followed by medium, semi medium and small categories, whereas cost of production (Table 3) was highest in case of semi medium farmers followed by small, marginal and medium categories .

**Table 3: Cost of Production of Paddy (Rs. /Quintal)**

| | Farm Size Category | | | | |
|---|---|---|---|---|---|
| **Particulars** | **Marginal** | **Small** | **Semi medium** | **Medium** | **Combined** |
| Ploughing | 79.53 | 64.01 | 88.40 | 98.04 | 82.97 |
| Sowing | 41.07 | 36.94 | 41.82 | 40.78 | 40.27 |
| Manuring | 151.24 | 144.56 | 147.31 | 143.22 | 146.17 |
| Transplanting | 162.94 | 148.44 | 169.61 | 155.56 | 160.77 |
| Fertilizer application | 122.95 | 106.96 | 112.17 | 99.83 | 109.45 |
| Weeding | 212.10 | 253.54 | 178.33 | 126.91 | 191.58 |
| Irrigation | 28.24 | 29.20 | 29.04 | 27.94 | 28.80 |
| Plant protection chemicals application | 69.73 | 43.07 | 61.41 | 77.41 | 60.33 |
| Harvesting | 117.73 | 120.97 | 113.60 | 105.01 | 114.30 |
| Post harvesting costs | 153.71 | 141.71 | 172.38 | 194.99 | 166.83 |
| Interest on working capital | 24.92 | 23.83 | 24.37 | 23.40 | 24.10 |
| **Total variable cost** | 1164.16 | 1113.24 | 1138.42 | 1093.09 | 1125.59 |
| Total fixed cost | 525.74 | 579.21 | 567.20 | 560.21 | 565.28 |
| Total cost of production | 1689.90 | 1692.45 | 1705.63 | 1653.30 | 1690.86 |

A perusal of extent of mechanization (Table.4) revealed that machine labour constituted 10.35% of total labour cost. Across categories it was highest in case of medium farmers (12.81%) followed by semi medium, marginal and small farmers in that order. Average paddy yield was highest in case of medium farmers (Table 5). This coupled with highest machine labour utilization led to lowest cost of production on these farms.

**Table 4: Cost incurred on manual and machine labour in paddy cultivation**

| Particulars | Human labour cost Rs./ha | Machine labour cost Rs./ha | Share of machine labour in total labour cost |
|---|---|---|---|
| Marginal | 45237.52 | 4695.66 | 9.40 |
| Small | 42641.12 | 3654.93 | 7.89 |
| Semi medium | 41053.46 | 5075.85 | 11.00 |
| Medium | 39823.55 | 5850.00 | 12.81 |
| All | 41620.22 | 4802.95 | 10.35 |

*Returns and Break Even Analysis*

At district level, total returns from paddy crop were Rs.79394.81 per hectare (Table.5).

**Table 5: Returns and Break even output in paddy cultivation**

| | Farm Size Category | | | | |
|---|---|---|---|---|---|
| **Particulars** | **Marginal** | **Small** | **Semi medium** | **Medium** | **All** |
| Total variable cost (Rs./ha) | 68731.95 | 63565.94 | 65368.31 | 65224.82 | 65160.22 |
| Total fixed cost (Rs/ha.) | 31039.61 | 33073.15 | 32568.84 | 33427.60 | 32723.87 |
| Yield in quintals/ha | 59.04 | 57.10 | 57.42 | 59.67 | 57.89 |
| Returns from main product(Rs/ha.) | | | | | |
| Returns from by product (Rs/ha.) | | | | | |
| Total Returns (Rs/ha.) | 80365.78 | 77271.47 | 79254.12 | 82389.58 | 79394.81 |
| Returns over variable cost (Rs.) | 11633.83 | 13705.53 | 13885.81 | 17164.76 | 14234.59 |
| Returns over total cost (Rs.) | -19405.78 | -19367.62 | -18683.03 | -16262.84 | -18489.28 |
| Output Price per unit (Rs/quintal.) | 1361.21 | 1353.27 | 1380.25 | 1380.75 | 1371.48 |
| **Break even output(BEO** in quintals) | 157.52 | 137.79 | 134.68 | 116.20 | 133.08 |
| BEO to Yield ratio | 2.67 | 2.41 | 2.35 | 1.95 | 2.30 |
| Required variable cost per unit(Rs.) where current yield become BEO at ceteris paribus | 835.47 | 774.05 | 813.05 | 820.55 | 806.20 |
| Required price per unit (Rs.) where current yield become BEO at ceteris paribus | 1689.90 | 1692.54 | 1705.63 | 1653.30 | 1690.86 |

Returns over variable cost were positive, but returns over total cost were negative in all farm size categories. From the results of Break Even Output (BEO) analysis in paddy cultivation it is evident that, the average yield obtained on different farm size groups was lesser than the break-even output. At district level BEO was 133.08 quintals indicating that a farmer should produce a minimum of 133.08q of paddy/ha so as to not incur any loss. Across categories break even output was higher in case of marginal farmers (157.52q) followed by small, semi medium and lower in medium farmers (116.20q). At aggregate level, the actual yield was 57.89 quintals. To make this yield (57.89q) as a break even output at given fixed cost, (i) variable cost per

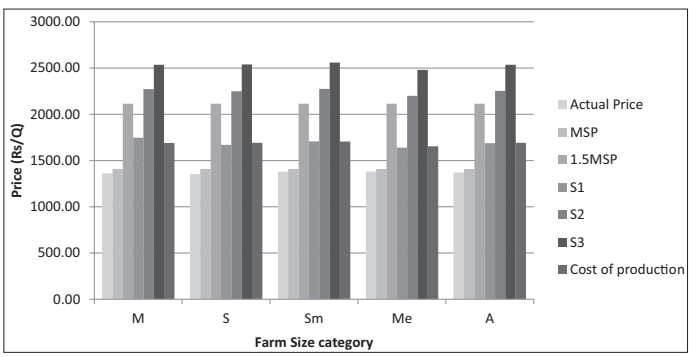



**Figure 2: Paddy price under different scenarios**

unit has to be reduced by 28.38% at actual price realized by farmers or (ii) price per unit has to be increased by 23.29% at actual variable cost incurred by the farmers.

In the context of proposed increase in M.S.P (at 1.5 times of expenses incurred by farmers) in recent union budget, different simulations of fixing support price was attempted and resultant price and BEO outcomes are depicted in Figure 2 and Figure 3.

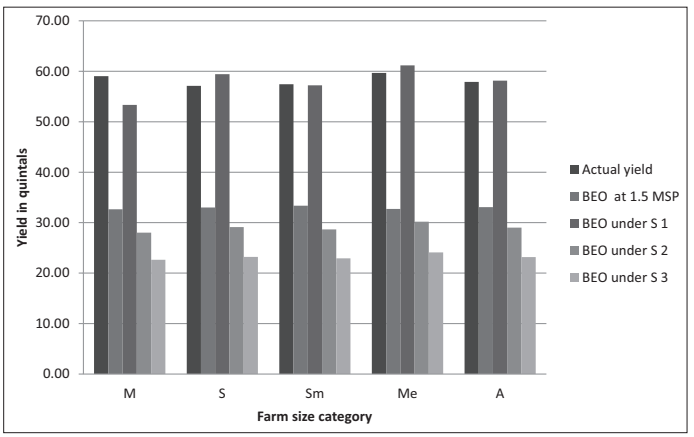



**Figure 3: Analysis of Break Even Output under different price fixing Scenarios**

M – Marginal S – Small Se – Semi medium Me – Medium A - All

Under Scenario-1 (S1), total returns were computed as 1.5 times of Total Variable Cost (TVC). Under Scenario-2 (S2), total returns were computed as 1.5 times of TVC+ Actual Total Fixed Cost. In Scenario-3(S3), total returns were computed as 1.5 times of Total Cost (TC). Dividing these total returns under different scenarios for different size category farms, with respective paddy yield, prices were obtained. Using these prices BEO was calculated under different scenarios.

From the Figure 2, it is evident that at aggregate level both MSP and price under S1 were lower than cost of production. In rest of the scenarios price was higher than cost of production. From the figure.3 it is clear that under S1 at aggregate level, BEO was almost equal to actual yield resulting in zero safety margins. Under S2 safety margin was around 50% and it increased to 60% under S3. Thus across scenarios considered, highest safety margin was associated with S3

Aggregating cost of cultivation data of different states and fixing MSP at all India level is creating problem to some extent in ensuring reasonable returns to farmers. Further, scrapping the provision of bonus payment (over MSP) by states in recent years added to this the problem. It is observed that at all India level also; margin between MSP and different costs for paddy was low (less than 50%) in recent years (Himanshu, 2018). In the present study it is observed that MSP (2015-16) is lower than cost of production and, and at this price BEO was more than yield. At1.5 times MSP though price could cover cost of production; the safety margin was 43% percent only. Thus it is observed in the present study that safety margin is higher when price is fixed based on regional cost of cultivation compared to price fixed based on aggregate national level MSP. In 2014, in Karnataka, a state level advisory body viz Karnataka Agricultural Prices commission was constituted (KAPC, 2014). One duty of this commission is estimation of cost of cultivation of principal crops of the state including horticultural crops regularly and systematically using standard cost concepts reflecting the local conditions of demand and supply of inputs and outputs. Similar initiatives can be thought of in other states also to get help in arriving at regional level cost of cultivation estimates.

Under different scenarios returns over total costs were computed and presented in Table 6.

**Table 6: Returns over total cost under different pricing Scenarios (Rs/ha)**

| Scenario | | Farm Size Category | | | | |
|---|---|---|---|---|---|---|
| | | Marginal | Small | Semi medium | Medium | All |
| Actual | | -19405.78 | -19367.62 | -18683.03 | -16262.84 | -18489.29 |
| MSP | | -16525.16 | -16128.09 | -16974.95 | -14517.72 | -16259.20 |
| 1.5*MSP | | 25098.04 | 24127.41 | 23506.15 | 27549.63 | 24553.25 |
| 1.5TVC | S1 | 3326.36 | -1290.18 | 115.32 | -815.19 | -143.76 |
| 1.5*TVC+TFC | S2 | 34365.98 | 31782.97 | 32684.16 | 32612.41 | 32580.12 |
| 1.5*TC | S3 | 49885.78 | 48319.55 | 48968.58 | 49326.21 | 48942.05 |

It is observed that at aggregate level returns over total cost were negative in the case of Scenario1, and at MSP. In rest of the scenarios it was positive. Under Scenario3, returns over total costs were Rs 48942 per ha. BEO analysis is subject to assumption of constant rate of increase in variable cost. Keeping this limitation in view, to get further insights regarding resource use efficiency in paddy cultivation in East Godavari district, Cob-Douglas production function was estimated and the results are presented in table 7. It is evident from the Table 7 except manures and fertilizers, all other inputs were contributing positively to productivity.

**Table 7: Determinants of Production of paddy farmers**

| Particulars | Coefficients | Standard Error | P-value |
|---|---|---|---|
| Intercept | 1.326 | 0.097 | 2.36257E-27 |
| Paddy( in acres) | 0.957 | 0.034 | 1.29453E-58 |
| labour days | 0.048 | 0.025 | 0.053738441 |
| Seed cost (Rs.) | 0.019 | 0.014 | 0.177561088 |
| No. of tractor hours | 0.003 | 0.017 | 0.825755257 |
| Manures and Fertilizers(Rs.) | -0.027 | 0.025 | 0.27947306 |
| Other expenses(Rs.) | 0.0008 | 0.018 | 0.965664386 |
| LD | 0.002 | 0.003 | 0.441039834 |
| R Square | **0.996** | | |
| Number of observations | 145 | | |

Among these inputs, land and labour were observed to be statistically significant. Though the expenditures on manures and fertilizers was with negative elasticity, it was statistically non significant. The variables considered in the model were able to explain 99.6% of variation in paddy production. While a study conducted by Jeena (2012) had reported diminishing returns to scale (0.69) in the context of Kerala, in the present study returns to scale is 1.00 indicating that cultivation of paddy in the study area is operating at constant returns to scale.

Results of resource use efficiency are furnished in Table 8. The ratio of marginal value product to marginal input cost in case of land was greater than unity, implying that production can be significantly increased by increasing the area of land under paddy cultivation. Except land, other factors have ratio of less than unity means they are being overused. So use of these inputs needs to be reduced for optimization of resource use.

**Table 8: Resource use efficiency in paddy cultivation**

| Particulars | Marginal value product (MVP) | Marginal Input cost (MIC) | MVP/ MIC |
|---|---|---|---|
| Paddy(in acres) | 30735.96 | 12568.88 | 2.45 |
| labour days | 38.02 | 308.67 | 0.12 |
| Seed cost (Rs.) | 0.82 | 1.00 | 0.82 |
| No. of tractor hours | 14.04 | 200.71 | 0.07 |
| Manures and Fertilizers(Rs.) | -0.17 | 1.00 | -0.17 |
| Other expenses(Rs.) | 0.02 | 1.00 | 0.02 |

**Conclusion and Implications**

This study examined the yield, input use, returns, break-even output and resource use efficiency in paddy cultivation in East Godavari district of Andhra Pradesh. At district level, total variable cost per hectare was Rs.65160.22 whereas total cost of cultivation per hectare was Rs.97884.09. Total variable cost accounts for 66.57% to the total cost. Labour cost constitutes around 63% of the total variable cost. At district level, total returns from paddy crop were Rs.79394.81 per hectare. In present situation, it is observed that the actual yield was less than BEO. Cobb-Douglas production function analysis revealed that, land was the highest predictor of the productivity level which states its continued importance in agriculture. Resource use efficiency analysis indicated over use of inputs other than the land.

Developing suitable short duration rice varieties may help in reducing cost of cultivation. Efforts need to be taken to encourage farmers to carry out cultivation collectively so as to make paddy cultivation economically more remunerative. Farmers need to be educated regarding optimal resource use. The proposed increase in MSP can improve viability of paddy cultivation, provided it is fixed based on regional cost of cultivation / cost of production as it is evident from the present study.

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