

RESEARCH ARTICLE :

Economics of rice cultivation in Nalgonda district

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SUMMARY : Nalgonda district has been purposively selected for the study as it has got bright agricultural resources for paddy production. Among the mandals in Nalgonda district, two mandals viz., Miryalguda, and Huzurnagar have been chosen for the study. The economics of rice cultivation has been worked out wherein the fixed costs showed direct relation with the farm size. The total cost of cultivation varied from Rs. 46711.78 for marginal farms to Rs. 48274.93 on large farms. The same for the small farms was Rs. 47312.39 with an overall average of Rs. 47433.03 for the sample as a whole was depicting a direct relationship with the farm size. The per kg cost was less on marginal farmers.

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KEY WORDS :

Rice cultivation,
Farmers

BACKGROUND AND OBJECTIVES

Agriculture continues to be a significant sector of Indian economy. From a nation dependent on food imports to feed its population, India today emerged as one of the leading producers in the world of many major crops like paddy, wheat, pulses, sugarcane, spices, and plantation crops. Rice is considered to be the oldest and ancient cereal with a history of more than 2800 years. India has 44.07 million hectares under paddy cultivation with a total production of 110.65 million tons in 2015-16. The major rice growing states are West Bengal, Uttar Pradesh, Andhra Pradesh (including Telangana), Punjab, Tamil Nadu, Orissa, Bihar and Chhattisgarh. Nalgonda district has major markets for paddy and is grown as the major crop in the Nagarjunasagar project (NSP) canal area due to which agro-based industries

are flourishing. The area under Paddy in Nalgonda district is 393743 ha and production is 1205285 t during 2013-14 (Department of Agriculture, Government of Andhra Pradesh). An attempt is made to take up economic analysis of paddy in Nalgonda district. As paddy is important food crop it is difficult to plan design policy related to paddy without examining the existing costs and returns, to the farmers.

RESOURCES AND METHODS

Nalgonda district has been purposively selected for the study as it has got bright agricultural resources for paddy production. Data was collected from a total sample of 120 farmers belonging to three categories marginal, small and large farmers. The primary data required for the study was collected through personal interview with the help of a

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schedule.

Cost of cultivation :

The cost of cultivation refers to the total expenses incurred by the farmers in cultivating paddy expressed on a per hectare basis.

Cultivation costs :

It included operational and material costs in cultivating paddy in an agricultural year. The various costs included were costs of labour, seed, manures, fertilizers, chemicals, depreciation, and interest on working capital (8%) and interest on fixed capital (6%).

Cost concepts :

The cost concepts were used to estimate the cost of cultivation and to derive the farm efficiency measures. The cost concepts viz., cost A1, cost A2 cost B1 cost B2 and cost C were used in the present study and these are derived as follows:

Cost A1:

It includes all actual expenses in cash and kind in production by the owner farmer such as, value of hired human labour, owned and hired bullock labour, owned and hired machinery services, value of farm produced seed or purchased seed and FYM, value of fertilizers, plant protection chemicals, depreciation of implements and machinery, land revenue, interest on working capital and miscellaneous expenses.

Cost A2:

Cost A1 + rent paid for leased in land. In the present study marginal farmers had no leased in land. Hence cost A1 and cost A2 are one and the same. However, it is worked out for small and large farmers.

Cost B1:

Cost A1 + interest on fixed capital.

Cost B2:

Cost B1+rental value of own land+rental value for leased in land.

Cost C:

Cost B1 + imputed value of family labour. It gives the total cost of cultivation.

Farm income measures:

Gross income:

The income obtained from the sale of the product. The actual amounts received from product marketed at the prevailing price were considered for arriving at gross income.

Net income:

This is the surplus over the gross costs *i.e.*, commercial cost of cultivation (cost C). It is one of the best measures to assess and compare farm.

Farm business income:

Gross income – cost A1

Family labour income:

Gross income – cost B1

Farm investment income:

Farm business income – imputed value of family labour.

Benefit-cost ratio:

Net income/cost C

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

The costs and returns of production of paddy (Kharif 2011-13) :

Cost of cultivation was calculated on per hectare basis separately for three categories of farmers-marginal, small and large and subsequently arrived at unit cost of production.

Human labour is a major cost component influencing the cultivation of any farm commodity. Successful completion of any farm operation requires human labour. The human labour required for each operation depends on the nature and size of the farm enterprise. It was found that the quantity of labour used for paddy cultivation was 45 man days. In the category of machine labour use of tractors is gaining popularity for operations like ploughing, clods crushing, puddling while harvesters were used for harvesting the produce. The machine power use on different size farms for paddy is presented in Table

1.

The total machine power used in cultivation varied from 14.5 hours per hectare by marginal farmers to 13 hours per hectare by small and 13.5 hours per hectare by large farmers. The average use of machine power for pooled farmers was found to be 13.6 hours. It is evident that irrespective of the farm size tractors are widely used in paddy cultivation.

Before examining the costs incurred by the farmer, the number of labour days, quantum of material inputs like seed, FYM, fertilizers plant protection chemicals etc., used in paddy cultivation per hectare on different size groups are presented in Table 1.

The seed rate used in three sizes of farm marginal, small and large farms used 75.64 kg, 74.32 kg and 74.2

kg of seed per hectare, respectively. While the average quantity of seed utilized was 74.36 kg. However the recommended seed rate varied from 62.5 kg ha⁻¹ to 75 kg ha⁻¹. On an average 4.89 t of FYM per hectare was used on pooled farms and this varied from 6t/ha on marginal farms, 4.1 t ha⁻¹ on small farms and 4.2 t ha⁻¹ on large farms. Other green leaf manures were also applied like jeelugu which varied from 60 kg ha⁻¹ 45 kg ha⁻¹ and 37.5 kg ha⁻¹ on marginal, small and large, respectively. The average use of the same for pooled farms was found to be 49.2 kg ha⁻¹. Marginal farmers used more FYM, other organic manures and machine labour.

Chemical fertilizers such as DAP, urea 20-20-0 and potash were applied. It can be seen from the table the

Table 1 : Quantum of inputs used in paddy cultivation

Sr. No.	Inputs	Marginal	Small	Large	Overall average
1.	Seeds (kg ha ⁻¹)	75.64	74.32	74.21	74.37
2.	Labour (mandays ha ⁻¹)	55.00	43.00	37.50	45.10
3.	Quantity of FYM (t ha ⁻¹)	6.00	4.11	4.20	4.90
4.	Quantity of other organic manure (kg ha ⁻¹)	60.00	45.00	37.50	49.29
5.	Machine power (h ha ⁻¹)	13.50	13.00	12.00	12.80
6.	Plant protection chemical l/ha	2.60	2.40	2.00	2.30
7.	DAP (kg ha ⁻¹)	153.55	167.78	170.96	164.48
	Urea (kg ha ⁻¹)	221.25	234.38	219.38	225.00
	20-20 (kg ha ⁻¹)	134.72	183.33	216.67	170.14
	Potash (kg ha ⁻¹)	62.50	66.67	91.67	79.55

Table 2 : Cost of cultivation of paddy for sample farmers

Sr. No.	Cost components	Marginal	Small	Large	overall
1.	Total human labour	11193.1 (23.96)	11741.8 (24.82)	11215.47 (23.23)	11383.46 (24.00)
2.	Total machinery labour	8018.75 (17.17)	7805.00 (16.50)	8493.95 (17.59)	8105.899 (17.09)
3.	Seeds	1584.45 (3.39)	1481.03 (3.13)	1591.98 (3.30)	1552.48 (3.27)
4.	FYM	1232.14 (2.64)	829.80 (1.75)	864.86 (1.79)	975.60 (2.06)
5.	Jeelugu	840.00 (1.80)	957.00 (2.02)	1160.00 (2.40)	985.67 (2.08)
6.	Fertilizers	4718.78 (10.10)	5106.60 (10.79)	5234.78 (10.84)	5020.05 (10.58)
7.	Miscellaneous charges	354.16 (0.76)	380.96 (0.81)	412.56 (0.85)	382.56 (0.81)
8.	Plant protection chemicals	2088.81 (4.47)	2183.96 (4.62)	2380.95 (4.93)	2217.91 (4.68)
9.	Interest on working capital @ 8%	720.72 (1.54)	728.86 (1.54)	744.83 (1.54)	731.47 (1.54)
10.	Total variable costs	30750.92 (65.83)	31215.01 (65.98)	32099.37 (66.49)	31355.10 (66.10)
11.	Depreciation	571.58 (1.22)	604.76 (1.28)	681.03 (1.41)	619.12 (1.31)
12.	Land revenue	0.00	0.00	0.00	0.00
13.	Rental value of owned land	15000.00 (32.11)	15100.00 (31.92)	15100.00 (31.28)	15066.67 (31.76)
14.	Interest on fixed capital @ 6%	389.29 (0.83)	392.62 (0.83)	394.53 (0.82)	392.14 (0.83)
15.	Total fixed costs	15960.87 (34.17)	16097.38 (34.02)	16175.55 (33.51)	16077.93 (33.90)
16.	Total cost (Rs.)	46711.78 (100.00)	47312.39 (100.00)	48274.93 (100.00)	47433.03 (100.00)

Note: Figures in parentheses are percentages to total cost.

fertilizer is consumed in excessive quantities. The use of plant protection chemicals included the insecticides, pesticides and weedicides. It is evident from Table 1 that marginal farms used more pesticides of 2.6 l ha⁻¹ followed by 2.4 l ha⁻¹ and 2 l ha⁻¹ by small farms and large farms, respectively. However the average quantity of plant protection chemicals used was 2.3 l ha⁻¹. It is because of lack of knowledge on the economic threshold levels of pest complex, marginal farmers used more amount of pesticides.

Cost of cultivation of paddy :

Cost of cultivation of paddy was calculated per hectare separately for the three categories, marginal small and large with pooled sample size of 120. The particulars of cost of cultivation of paddy were presented in Table 2

From Table 2 it could be observed that the total cost of cultivation was worked out for the sample farms according to size of farms. The total cost of cultivation varied from Rs. 46711.78 for marginal farms to Rs. 48274.93 on large farms. The same for the small farms was Rs. 47312.39 with an overall average of Rs. 47433.03 for the sample as a whole depicting a direct relationship with the farm size.

The total fixed cost worked out to be Rs. 15960.87 (34.17 %) Rs. 16097.38 (34.02 %) and Rs. 16175.55 (33.51 %) for marginal, small and large farms, respectively. The overall average was found to be Rs. 16077.93 (33.90). This clearly indicated that the fixed costs showed direct relation with the farm size. During the period of study the sample area has not received irrigation from left canal of Nagarjunasagar project (NSP) and so the sample farmers have not incurred any cost towards land revenue.

The human labour accounted for about 23.96 percent, 24.82 per cent 23.23 per cent and 24 per cent of total cost of cultivation on marginal, small, large and pooled farms, respectively and did not differ between groups. While the machinery labour was found to account 17.17 per cent, 16.5 per cent, 17.59 per cent and 17.09 per cent for marginal, small, large and all farms, respectively. It is to be noted that high cost of human labour in small farms when compared to marginal and large farms was due to the fact that small farms employed many human labour for harvesting reflecting low machinery costs for small when compared to marginal

and large farms.

But from Table 2 it is seen that though marginal farmers used more number of machine power that is 14.5 hours per hectare, the cost of in absolute terms was not highest among the groups. In terms of cost incurred towards machinery labour it was found that large farmers incurred Rs. 8493.95 per hectare which was higher compared to marginal and small farmers. So this is due to the use of tyre machine by large farmers and tractor mounted harvester by small and marginal farmers. Use of chain type of harvester by large farmers which was costing more than tyre type of harvester.

It is clear from the table that apart from labour fertilizers, plant protection chemicals and seed were among the major costs.

The expenditure towards fertilizers accounted to Rs. 4781.87 (10.10 %), Rs. 5106.60 (10.79 %), Rs. 5234.78 (10.84 %) and Rs. 5020.05 (10.58 %) on marginal small large and pooled farms, respectively. Thus large farmers were spending slightly higher amount in absolute figures on fertilizers followed by small and marginal farms.

On further examining the table it is clear that plant protection chemicals also took a considerable share in total cost of cultivation. It was 4.47 per cent, 4.62 per cent, 4.93 per cent and 4.68 per cent of total cost of cultivation on marginal, small, large and all farms, respectively.

The cost incurred on seed for marginal, small, large and small farms was in the order of Rs. 1584.45 (3.39 %), Rs. 1481.03 (3.13 %), Rs. 1591.98 (3.30 %) and Rs. 1552.48 (3.27 %), respectively.

The other items of cost among variable costs include FYM, green leaf manures followed by interest on working capital and miscellaneous charges.

The results obtained were in confirmation with study of Emongór *et al.* (2009) where it is stated that among the various inputs used in rice production the largest cost item was labour followed by fertilizer.

Cost of cultivation according to cost concepts :

For analyzing, Cost A1, Cost A2, Cost B1, Cost B2 and Cost C concepts per hectare were calculated.

The information with regard to cost of cultivation according to cost concepts per hectare for paddy is presented in the Table 3 It can be seen from the data that cost A1 was Rs. 30045.26 on marginal farms, Rs. 30802.73 on small farm and Rs. 31902.40 on large farms

and Rs. 30916.80 on all farms. The cost A2 is worked out for small and large farms only as marginal farms do not hold well leased in land. Cost A2 was Rs. 40802.73 Rs. 41902.40, Rs. 40916.80 for marginal, small, large and all farms, respectively. The cost B1 which ranged from Rs. 45434.55 on marginal farms, Rs. 46295.35 on small farms and Rs. 47396 on large farms has exhibited a direct relationship with farm size. The cost B2 was Rs. 60434.55 Rs. 71395.35 Rs. 72496.92 and Rs. 71442.28 per hectare for marginal small large and all farms, respectively. The cost C values varied from Rs. 46711.80 on marginal farms to Rs. 47312.39 for small farms and Rs. 48274.92 on large farms and Rs. 47433.03 on all farms and indicated the direct relation with the farms size.

The particulars of unit cost of production, output and returns, average cost of production are presented in Table 4.

The average production of paddy varied from 5760 kg ha⁻¹ on small farms to 5888 kg ha⁻¹ on large farms.

The same was worked out to be 5866 kg ha⁻¹ and 5838 kg ha⁻¹ for marginal and all farms, respectively. The per kg cost of production was worked out to be lowest on marginal farms (Rs. 7.96) when compared to small (Rs. 8.21) and large farms (Rs. 8.21) while the average per kg cost of production was Rs. 8.12 on all farms. The per kg cost is less on marginal farmers.

The benefit-cost ratio was also worked out for different farm sizes. It was 1.60 for marginal farms 1.55 for small farms and 1.56 for large farms while the average benefit cost ratio for all farms was worked out to be 1.57. This did not show any definite relationship with the farm size.

Returns from paddy cultivation according to farm size (Farm income measures) :

An attempt has been made to compute all the five measures of income. *viz.*, gross income, net income, farm business income, family labour income and farm investment income per hectare of land and the

Table 3 : Cost of cultivation in paddy according to cost concepts Kharif 2012-13

Sr. No.	Cost component	Marginal	Small	Large	Overall
1.	Cost A1	30045.26	30802.73	31902.40	30916.80
2.	Cost A2	30045.26	40802.73	41902.40	40916.80
3.	Cost B1	30434.55	31195.35	32296.92	31308.94
4.	Cost B2	60434.55	71395.35	72496.92	71442.28
5.	Cost C	46711.80	47312.39	48274.92	47433.03

Table 4 : Unit cost of production and benefit-cost ratio

Sr. No.	Output and returns	Marginal	Small	Large	Overall average
1.	Total cost of cultivation	46711.80	47312.39	48274.92	47433.03
2.	Average production of paddy (kg ha ⁻¹)	5866.00	5760.00	5880.00	5838.00
3.	Gross returns @ 12.80/Kg	75084.80	73728.00	75366.40	74726.40
4.	Net returns	28373.00	26415.61	27091.48	27293.37
5.	Cost of production of paddy per kg	7.96	8.21	8.21	8.12
6.	Net returns Rs. per kg	4.84	4.59	4.61	4.68
7.	Benefit cost ratio	1.61	1.56	1.56	1.58

Table 5 : Farm income measures

Sr. No.	Particulars	Marginal	Small	Large	Overall
1.	Average Production q/ha	58.66	57.6	58.88	58.38
2.	Price Rs. /q	1280	1280	1280	1280
3.	Gross returns	75084.8	73728	75366.4	74726.4
4.	Farm business income	45039.54	42925.27	43464	43809.6
5.	Family labour income	29650.25	27432.65	27969.48	28350.79
6.	Net income	28373	26415.61	27091.48	27293.37
7.	Farm investment income	43762.3	41908.27	42586	42752.2

information is presented in Table 5

Gross income :

It is clear from the table that gross income varied from Rs. 73728 on small farms to Rs. 75366.4 on large farms. The same was Rs. 75084 and Rs. 74276.4 on marginal and all farms.

Net income :

The net income also did not indicate any definite relationship with farm size. The net income was Rs. 28373 on marginal, Rs. 26415.61 on small and Rs. 27091.48 on large farms with an overall average of Rs. 27293.37 but net income was highest on marginal farms.

Family labour income :

It is evident from the Table 5 that family labour income was the highest for marginal farms Rs. 29650.25 followed by large farms Rs. 27969.48 and small farms Rs. 27432.65 with an overall average of Rs. 28350.79. The family labour income was high on marginal farms as they involve their family labour to reduce the expenses of casual labour.

Farm business income :

The farm business income varied from Rs. 42925.7 on small farms to Rs. 45039.54 on marginal farms. The same on large and all farms was worked out to be Rs. 43464 and Rs. 43809.6. Thus farm business income also did not show any definite relationship with the farm size.

Farm investment income :

Similar trend was observed with farm investment income as in other income measures, that is it has not exhibited any definite relationship with farm size. It was Rs. 43762.3 on marginal farms, Rs. 41908.27 on small

farms, Rs. 42586 on large farms and Rs. 42752.2 on all farms.

Conclusion :

The paddy cultivation was profitable. The results indicated that the total cost of cultivation per hectare was Rs. 47433.03 and gross income realized from paddy cultivation was Rs. 74726.40 per hectare. The net income was Rs. 27293.37 per hectare. The benefit cost ratio was 1.58. The average production of paddy was 5838 kg ha⁻¹. The per kg cost was less on marginal farmers. The benefit-cost ratio did not show any definite relationship with the farm size. Agricultural marketing is of critical concern especially in the areas which have potential for high production. So technical support for water management is recommended. As canal irrigation was identified as a major problem which was hindering production of paddy by the farmers and thereby affecting the millers and middlemen.

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