



Resource Productivity and Allocative Efficiency of Tobacco in Prakasam District of Andhra Pradesh

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ABSTRACT

This study was conducted to estimate cost and net revenue from tobacco in Prakasam District during 2003-04. The study was conducted in two mandals and six villages were purposively selected from Prakasam district of Andhra Pradesh. A total of 42 respondents were randomly selected from the above six villages. Who were interviewed through a well-designed questionnaire. The Cobb- Douglas production function model was chosen to estimate the resource productivity and returns to scale. Increasing returns to scale prevailed in the study area and also gives signal of higher input use efficiency. MVP to OC ratio was less than unity for inputs like human labour, fertilizers and pesticides indicating excessive use. So there is a tremendous scope for reorganization of resources for curtail the inputs to obtaining maximum profits.

Key words : Allocative, Resource Productivity.

In India amongst all food and non food crops the tobacco crop possesses peculiarities of its own nature. Tobacco is basically one of the important cash crops not only of this country but throughout the world and considerable importance of tobacco as a cash crop can be gauged from the fact that about 30% of the federal Govt. revenue receipts from the CED (Custom and Excise Duties) and taxes are derived from this source.

Another notable feature is that per hectare gross valued out-turn of tobacco crop is on higher side compared to other crops (including cash crops) in the country. Thus on the small acreage, it gives more return per acre as compared to other crops. Being a highly labor oriented crop, it provides employment opportunities at the time of production, curing and in the tobacco factories where it is processed for cigarette manufacturing.

Presently tobacco is produced all over the world but the principal tobacco growing countries are China, India, Brazil, USA, Turkey, Indonesia, Zimbabwe, and Pakistan. China is the largest tobacco producing country in the World. India is the second largest producer of tobacco in the world, while India share in the world's area under tobacco crop has risen from 9% to 11% in the last 3 decades; its share in production has inched up from 8% to 9% in tobacco industry. Problems in the manufacturing and export of tobacco are well

known. The peculiar feature of tobacco trade is that USA, being an important exporter of manufactured tobacco, is the leading importer of tobacco needed for blending purposes. Other countries are Argentina, Egypt, France, Germany and UK. The quality of tobacco and price are the principal determining factors in its trade at the international level. The production and manufacturing of tobacco is highly fascinating by any yardstick. Not only it involves a scientific treatment, but it requires special attention by the producers during the production, curing and marketing stages. India is the eighth largest exporter of Tobacco and Tobacco products in the world. Andhra Pradesh, Gujarat and Karnataka are the major producing states in the country. Tobacco is an important cash crop in Prakasam district and provides employment and income generation to human being. The study of mainly emphasizes the resource use efficiency tobacco production in Prakasam district of Andhra Pradesh.

MATERIAL AND METHODS

The study has been based on primary data collection from tobacco growers through personal interview method during the agricultural year 2003-04 in Prakasam district of Andhra Pradesh. Two mandals and six villages were purposively selected from Prakasam district of Andhra Pradesh. A total

of 42 respondents were randomly selected from the above six villages. The collected data was transferred to tally sheets and then punched into computer.

Cobb- Douglas production function is the best suited model to estimate the resource productivity and returns to scale. The general form of the model is:

The specific form of Cobb-Douglas production function

$$Y = a x_1^{b_1} x_2^{b_2} x_3^{b_3} x_4^{b_4} x_5^{b_5} x_6^{b_6} x_7^{b_7} Ut$$

The log linear transformation of this production function is

$$\log Y = \log a + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + b_6 \log x_6 + b_7 \log x_7 + \log Ut$$

Where,

Y = Gross output (kgs./ha)

x_1 = area (ha).

x_2 = seedlings (No/ha).

x_3 = Human labour (Mandays).

x_4 = Bullock labour (Mandays).

x_5 = Manures (Rs/ha).

X_6 = Fertilizers (Rs./ha).

X_7 = Pesticides (Rs/ha).

Ut = Error term

a = Intercept

b_1 to b_7 = Production elasticities of the respective inputs

RESULTS AND DISCUSSION

Resource productivity and allocative efficiency of tobacco of different size farms were presented in Table 1.

It was observed from the table1, that the co-efficient of multiple Regression were 0.78, 1.00, 0.99 and 0.97 for small, medium, large and overall farms indicating 78, 100, 99 and 97 percent of variation its gross returns.

Small farms:

In this group land (X_1), fertilizers (X_2) were found to be significant at 5% and 1% level of significance respectively. The production elasticities of these inputs indicates that one percent increase in each input, keeping all other inputs constant at

their respectively geometric mean level, would increase the gross returns by 0.026 and 0.04 percent.

Seedlings, human labour and pesticides are positively non-significant. It indicating that the excessive case of these inputs in the production process but not in significant level. Hence there is a need to curtail the expenditure on these inputs.

Medium farms:

In this farms land (X_1) found significant at 5% level. The seedlings (X_2), human labour (X_3), fertilisers (X_5) and manure (X_7) are found to be significant at 1% level. This is indicating the significant influence of these inputs. While the human labour and pesticides found to be non-significant with positive sign. Hence there is a need to curtail the expenditure on those inputs.

Large farms:

The co-efficient of seedlings (X_2) Bullock labour (X_4) and fertilisers (X_5) are positively significant at 10% level. Land (X_1), human labour (X_3) and manure (X_7) are found positive but not significant. Co-efficient associated with the pesticides (X_6) are found to be negatively significant and indicating that the excessive use of these inputs.

All farms:

The Regression co-efficient of the seedlings (X_2) human labour (X_3) and fertilisers (X_5) were turned out to be positively significant at 1% level. It clearly indicating that one percent increase in expenditure of these inputs would raise the gross income by one percent.

The co-efficient of bullock labour (X_4), pesticides (X_6) and manures (X_7) were found positively non-significant.

It is clearly understood from the foregoing analysis, that the inputs, seedlings, human labour and fertilizers got a significance influence in enhancing the FCV tobacco yields irrespective of the farm size.

While bullock labour, pesticides are positively non-significant. Hence there is a need to curtail the expenditure on these inputs.

This warrants judicious tailoring of the excessive application of these negatively influencing factors in this important heavy soils cultivating FCV tobacco crop. This contract our second hypothesis

that seedlings, human labour and fertilizer were using sufficiently than the bullock labour, pesticides and manure in all the farms.

Return to scale:

Sum of elasticities of resources on Cobb-Douglas production function, indicates return to scale as it is clearly seen in the table. The sums of elasticities are 2.456, 1.371, 1.166 and 1.479 on small, medium, large and overall farms respectively. It indicates that the production performance of all

farms in the district is in the increasing trend. It also gives signal of higher input use efficiency.

Resource use efficiency:

The ratio of the marginal value product to marginal factor cost of the individual resources was used to judge the resource use efficiency. The computed marginal value product was compared with the marginal factor or opportunity cost of the resources to draw the inferences. A resource said to be optimally allocated when its MVP = MFC.

Table 1. Production elasticities of inputs, returns to scale and coefficient of Multiple determination of different size groups of tobacco crop in Prakasam district of Andhra Pradesh.

S. No.	Item	Small	Medium	Large	Overall
1	Area(x_1)	0.026* (2.214)	0.036* (-2.456)	0.220 (2.781)	0.825 (0.223)
2	Seedlings (x_2)	0.435 (-0.821)	0.007** (3.439)	0.084*** (-7.536)	0.004** (3.107)
3	Human labour(x_3)	0.653 (0.468)	0.001** (5.245)	0.178 (-3.479)	0.001** (5.019)
4	Bullock labour(x_4)	0.308 (-1.09)	0.917 (-0.108)	0.59*** (10.836)	0.308 (1.035)
5	Manures(x_5)	0.101 (-1.850)	0.004** (3.893)	0.117** (-1.261)	0.072 (1.859)
6	Fertilizers(x_6)	0.004** (3.53)	0.004** (3.814)	0.056*** (11.381)	0.001** (3.853)
7	Pesticides (x_7)	0.929 (0.092)	0.402 (0.879)	-0.079* (-8.040)	0.268 (2.193)
8	Sum of elasticities (Sb_1)	2.456	1.371	1.166	1.479
9	R ² value	0.78	1.00	0.990	0.976

* Significant at 5% level

** Significant at 1% level

*** Significant at 10% level

NS – Non significant

The marginal value product was calculated at the geometric mean levels of the variables using the formula.

MVP of a resource $X_i = b_i * Y / X_i$

Y = Geometric mean of the gross return

X_i = Geometric mean of the i^{th} resource

b_i = Elasticity of production of the i^{th} resource

The marginal factor cost was taken as unity since the X and Y variables were defined in monetary items. The marginal value products (MVP), opportunity costs (OC) and their ratios are presented in the table 2, 3, 4 & 5

Table 2. Marginal Value Product to Opportunity Cost of small farms.

S. No.	Item	MVP	OC	MVP/ OC	Resource use efficiency
1	Seedlings (x_2)	0.1486	1.00	0.1486	excessive utilization
2	Human labour(x_3)	1.5239	1.00	1.5239	Under utilization
3	Bullock labour(x_4)	-0.2982	1.00	-0.2982	excessive utilization
4	Manures(x_5)	2.3190	1.00	2.3190	Under utilization
5	Fertilizers(x_6)	1.23	1.00	1.23	Under utilization
6	Pesticides (x_7)	-0.0518	1.00	-0.0518	excessive utilization

It is observed from the above table that in small farms, MVP to OC ratio for seedlings, bullock labour and pesticides was less than unity, indicating excess utilization of resources. So there is a scope for reorganization of resources.

Table 3. Marginal Value Product to Opportunity Cost of Medium farms.

S. No.	Item	MVP	OC	MVP/ OC	Resource use efficiency
1	Seedlings (x_2)	1.46	1.00	1.46	Under utilization
2	Human labour(x_3)	0.98	1.00	0.98	excessive utilization
3	Bullock labour(x_4)	1.70	1.00	1.70	Under utilization
4	Manures(x_5)	1.23	1.00	1.23	Under utilization
5	Fertilizers(x_6)	0.68	1.00	0.68	excessive utilization
6	Pesticides (x_7)	-0.0898	1.00	-0.0898	excessive utilization

It is observed from the above table that in medium farms, MVP to OC ratio for seedlings, bullock labour and manures was greater than unity, indicating the increase in the use of these inputs with secure higher returns and profits.

Table 4. Marginal Value Product to Opportunity Cost of large farms.

S. No.	Item	MVP	OC	MVP/ OC	Resource use efficiency
1	Seedlings (x_2)	1.53	1.00	1.53	Under utilization
2	Human labour(x_3)	-1.71	1.00	-1.71	excessive utilization
3	Bullock labour(x_4)	2.79	1.00	2.79	Under utilization
4	Manures(x_5)	0.78	1.00	0.78	Under utilization
5	Fertilizers(x_6)	-1.72	1.00	-1.72	excessive utilization
6	Pesticides (x_7)	-0.049	1.00	-0.049	excessive utilization

It is observed from the above table that in large farms MVP to OC ratio for human labour, fertilizers and pesticides was less than unity, indicating excess utilization of resources. So there is a scope for reorganization of resources.

Table 5. Marginal Value Product to Opportunity Cost of overall farms.

S. No.	Item	MVP	OC	MVP/ OC	Resource use efficiency
1	Seedlings (x_2)	3.28	1.00	3.28	Under utilization
2	Human labour(x_3)	-1.34	1.00	-1.34	excessive utilization
3	Bullock labour(x_4)	2.73	1.00	2.73	Under utilization
4	Manures(x_5)	0.69	1.00	0.69	Under utilization
5	Fertilizers(x_6)	-0.98	1.00	-0.98	excessive utilization
6	Pesticides (x_7)	-0.63	1.00	-0.63	excessive utilization

It is observed from the above table that in over all farms MVP to OC ratio for human labour, fertilizers and pesticides was less than unity, indicating excess utilization of resources. So there is a scope for reorganization of resources.

SUMMARY AND CONCLUSIONS:

It is observed that increasing returns to scale exist in the study area. MVP to OC ratio was less than unity for human labour, fertilizers and pesticides, indicating excess utilization of resources. So there is a scope for reorganization of resources

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