

INPUT-OUTPUT ANALYSIS OF COARSE CEREALS PRODUCTION WITH SPECIAL REFERENCE TO SALEM DISTRICT

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INTRODUCTION

Over 60 percent of India's total land is under agriculture and nearly 23 percent of area is covered forest. India is an "agriculture economy", 70 percent of its rural households still depend primarily on agriculture for their livelihood. Agriculture is a multifunctional activity, which provides livelihood, employment, food and fodder, nutritional and ecological security etc. People's ends are unlimited and resources are scarce. Therefore, the optimum allocation of scarce resource is necessary for the agricultural development. The term "resource use efficiency in agriculture" may be broadly defined to include the concepts of technical efficiency, allocation efficiency and environmental efficiency. An efficient farmer allocates his land, labour, water and other resources in an optimal manner, so as to maximize his income, at least cost on sustainable basis. The focus here is on coarse cereals, which have been left behind by the green revolutions. In this paper an attempt has been made to analyse the cost and return performance of coarse cereals production and to identify the efficient of factor resource for coarse cereals production in Salem district. In addition an attempt has been made to identify the constraints hindering growth of coarse cereals and some policy intervention to maximize profit of the coarse cereals producing farmers.

Cereal grains have been considered as the principal component of human diet for thousands of years. It played a major role in shaping human civilization. Around the world, rice, wheat, maize and to a lesser extent of sorghum and other small millets are important staples critical to daily survival of billions of people. The cereal grains directly contribute more than half of all calories consumed by human beings. Coarse Cereals crops like cholam, cumbu, ragi, maize and other small millets varagu, samai, kudhiraivali and thenai) termed as coarse cereals have been the primary components of the food basket of rural India. Rain-fed regions of India like Karnataka, Maharashtra, Tamil Nadu, Madhya Pradesh, Rajasthan, and Gujarat are best suited for coarse cereal crops, and coarse cereals are therefore cultivated predominantly in these areas. In Tamil Nadu, a downturn has been witnessed in the

area covered under coarse cereals cultivation from 1966 thousand hectares in 1965–66 to 926 thousand hectares in 2014–15. Significant increases in the yield of coarse cereals has been witnessed from 715 kg/ha in 1965–66 to 4401 kg/ha in 2014–15. Production of coarse cereals in 1965–66 was 1405 thousand tonnes, which increased to a maximal level of 4078 thousand tonnes in 2014–15. However, decrease in area allocation of coarse cereals is mainly because of a shift in area of cultivation to other competing crops.

The study therefore seeks to achieve the following objectives:

- 1) To study the constraints faced for crop production
- 2) To assess the variation of input cost and return structure of coarse cereals production in Salem district.
- 3) Determine the efficiency of factor resource to the output of coarse cereals production.
- 4) Make the policy recommendation based on findings of study.

MATERIALS AND METHODS

The primary data collected from the sample coarse cereals grower in the year 2018. For the collection of primary data, a multi stage stratified random sampling technique has adopted. In the first stage, Salem district of Tamil Nadu has purposively selected because of convenience of data collection. In the second stage, five blocks have selected based on major contributor of coarse cereals crop. Each block represents a each variety of coarse cereals viz, cholam, cumbu, ragi, maize and minor millets cultivation in the district. In the third stage, from the five blocks, based on the farmers size of the block different sample respondents from each block was selected and the present study is confined to a total sample of 150 coarse cereals cultivation farmers of five blocks in Salem district of Tamil Nadu. The study adopts the following two models for the collected primary data to analysis.

AREA OF STUDY

The economics of coarse cereals production based on the data collected from 150 sample farmer households selected from the five major coarse cereals cultivating blocks via, Omalur, Vzhapadi, Mettur, Attur and Pathanayakanpalayam blocks in Salem district of Tamil Nadu have been worked out for analysis. It may be noticed that in agriculture production, cost of production refers to the expenditure incurred by the farmers on the various inputs to obtain the final produce. Cost of cultivation varies from crop to crop and the expenses of coarse cereals production generally consists of land preparation cost, cost of seeds and

sowing, plant protection charges, cost of farmyard manures, weeding and irrigation cost and harvesting cost etc, which were directly link up with output. These would be an important costs, which determines how much to be produce. Therefore, it is the variable cost, based on which the major cropping decisions are taken at farm levels.

COBB-DOUGLAS PRODUCTION FUNCTION ANALYSIS (COST RETURN ANALYSIS)

The form of production function fitted for the select variables is

$$Y = \beta_0 X_1^{\beta_1}, X_2^{\beta_2}, X_3^{\beta_3}, X_4^{\beta_4}, X_5^{\beta_5}, X_6^{\beta_6}$$

Where, Y = value of coarse cereals crop output per acre

$$\log Y = \beta_0 + \beta_1 \log x_1 + \beta_2 \log x_2 + \beta_3 \log x_3 + \beta_4 \log x_4 + \beta_5 \log x_5 + \beta_6 \log x_6$$

The log-linear transformation of this function has stated as

Log Y = Gross Income of the crop in rupees per acre

X₁ = log of expenditure of land preparation in rupees per acre

X₂ = log of expenditure of seeds and sowing in rupees per acre

X₃ = log of expenditure of farmyard manures and manuring in rupees per acre

X₄ = log of expenditure of plant protection in rupees per acre

X₅ = log of expenditure of weeding and irrigation in rupees per acre

X₆ = log of expenditure of harvesting and processing in rupees per acre

β₀ is the intercept or constant term used in the production function

β₁ through β₆ is the regression coefficients in respect of various input factors.

CONSTRAINTS FACED FOR CROP PRODUCTION

The coarse cereals production has directly influenced by the factors such as area under cultivation, fertilizers consumption, rainfall and population of the state

- During the past decades, the area allocation for coarse cereals is decreasing trend. This is because of population is increasing at a high rate and this puts pressure on the agriculture sector. Agriculture has to provide food and employment to large sections of the people. This means that there is a requirement of additional land for agriculture but on the contrary, the rapid

growth in urbanization has converted the agricultural land into non-agricultural use.

- Coarse cereals are mainly depends upon monsoon, which is unreliable, uncertain and irregular. Even though, there has been a rapid expansion in the irrigation facilities, still about two-thirds of the cropped area is dependent upon monsoons.
- The area under all the coarse cereals in the state has declined except maize. This is due to shift of coarse cereals area to the other crops. The possible reason for the shift of the farmers from coarse cereals to the cash crops might be the fact that the farmers has become more commercialized with the expectation of high returns from farming.

RESULT OF THE STUDY

ESTIMATION OF COST AND RETURN OF COARSE CEREALS CULTIVATION IN SALEM DISTRICT

Growth is the necessary condition for the success of a crop in any region. The coarse cereals are rain-fed crops and directly contribute more than half of all calories consumed by human beings. Among the cereals, all the coarse cereals are considered as a poor man's food and it has less demand in domestic side because of change in food pattern. However, this is the main reason for malnutrition. Increase in agricultural production is continuously possible by increasing the productivity of land. The productivity of land depends on optimum allocation of resources, which are always considered either scarce or costly and would have a definite impact on the cost and revenue structure of crop farms. Therefore, the farmers, examination of the various items of costs involved in crop production and revenue expected from the same are very necessary that would have a definite implication on the profitability of crop farms in the area.

TABLE-1
ESTIMATED COST AND RETURN OF COARSE CEREALS CULTIVATION/PER
ACRE IN SELECTED BLOCKS OF SALEM DISTRICT IN TAMIL NADU

Variables	Cholam	Cumbu	Ragi	Maize	Other Millets	Coarse Cereals
Sample Size (N)	23	26	40	35	26	150
land preparation (X ₁)	1867 (14.20)	953 (10.12)	1036 (11.04)	1674 (11.32)	1816 (19.34)	1469 (13.09)
seeds and sowing (X ₂)	2798 (21.29)	1590 (16.88)	1594 (16.99)	2608 (17.64)	1204 (12.82)	1959 (17.45)
farmyard manures (X ₃)	3662 (27.86)	1702 (18.07)	1717 (18.30)	3477 (23.51)	1799 (19.16)	2471 (22.02)
plant protection (X ₄)	1173 (8.92)	425 (4.51)	441 (4.70)	443 (3.00)	394 (4.20)	575 (5.12)
weeding and irrigation (X ₅)	1941 (14.77)	1510 (16.03)	1031 (10.99)	1783 (12.06)	1558 (16.59)	1565 (13.94)
harvesting and processing (X ₆)	1704 (12.96)	3239 (34.39)	3561 (37.96)	4802 (32.47)	2620 (27.90)	3185 (28.38)
Total Cost	13145 (100)	9419 (100)	9380 (100)	14787 (100)	9391 (100)	11224 (100)
Total Return	23135	15636	15852	27652	15589	19573
Net Return	9990	6217	6472	12865	6198	8348
% of Return	76	66	69	87	66	74

Source: Collected by the researcher
 Figures in parenthesis are percentage
 Cost and Income are in terms of Rupees

The estimates furnished in table-1 showed that per acre cost and return particulars of the selected coarse cereals crop cultivating farmers in Salem. The area under coarse cereals, land preparation, seeds and sowing, farmyard manures, plant protection, weeding and irrigation, harvesting and processing were the important constituents determining the economics of coarse cereals production in the area. Of which, the average coarse cultivating farmers in the area ought to spend an average of about 28 percent of the total cost towards cost of harvesting and processing followed by farmyard manures with 22 percentage.

Among the coarse cereals crop maize has a dominated role followed by cholam with 87 and 76 percentage respectively, which are use for both food and fodder purpose. In the next place, ragi has shown 69 percentages, indicating the use of calcium rich food. The area allocations of cumbu and minor millets have decreased because of changing food pattern, which has showed lowest percentage comparing to the other coarse cereals.

IDENTIFICATION OF FACTORS INFLUENCING CROP PRODUCTIVITY

A log regression equation has worked out to find out whether farmers in Salem district used various input resources for coarse cereals crop production efficiently, keeping in view of their elasticity coefficients. It may be seen from table-2 that farmyard manures continued to influence production of coarse cereals in Salem district. This is necessary to increase the productivity of land. After that, harvesting processes followed by weeding and irrigation process were influence the efficient factor for production of coarse cereals.

TABLE-2

ELASTICITY COEFFICIENTS OF FACTORS DETERMINING COARSE CEREALS CROP PRODUCTIVITY IN SALEM DISTRICT IN TAMIL NADU

	Coefficient	T-Value
Intercept	3.059	5.533
land preparation	-0.027	-0.627
seeds and sowing	0.0159	0.257
farmyard manures	0.564	8.427
plant protection	-0.076	-1.542
weeding and irrigation	0.188	3.639
harvesting and processing	0.205	4.446
R Square	0.886	
F Value	184.32	
Sum of Regression	0.869	

Source: Calculated by the researcher

The selected factors of variables influence the coarse cereals production with 88 percentages that has shown in R square value 0.886. Sum of regression value has shown 0.869. This is the indicator of returns showing that decreasing returns in the coarse cereals production because of the fact that these farmers do not cultivate coarse cereals regularly as

their major crop and hence they are not equipped with the knowledge of maximizing from other cereals.

DISCUSSION OF THE STUDY

From the above analysis, the cost of cultivation for coarse cereals is very less comparing to the other food grains and the selected factor resources were efficiently influenced the production of the coarse cereals crop. Nevertheless, in the recent decades, area allocation of coarse cereals cultivation has decreasing trend with increasing production and productivity. The cultivation of other crops must be carried out as regular trend, but not on the cost of coarse cereals. Among the food grains, the coarse cereals are considered as a poor man's food and it has less demand in domestic side because of change in food pattern. However, this is the main reason for malnutrition. In overall the coarse cereals has been found to conserve the soil and water resource, increases farmer's income and thereby enhancing their economic well-being and livelihood security.

CONCLUSION

The present paper analyses the role of cost and return structure and resource use efficiency of coarse cereals production in Salem district. It has been found that gross return under coarse cereals crop is marginally higher, emphasizing the need for focus on coarse cereals cultivation. Cobb-Douglas production function model explains that 88 per cent of dependent variable has influenced by the set of all independent variables. This is because of the farmer's interest in coarse cereals crop and the steps taken up by the Government to achieve higher growth rate in agriculture. In view of numerous benefits conferred by the coarse cereals, our farmers should aim at growing more and more of the coarse cereals and people should include coarse cereals in daily food basket.

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