



## Cost and Returns of Maize Cultivation in Tirupur District

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### ABSTRACT

*Maize provides nutrients for humans and animals and serves as a basic raw material for the production of starch, oil and protein, alcohol beverages, food sweeteners and more recently, fuel. Maize is high yielding, easy to process, and costs less than other cereals. The result of the study would help in finding out the relative contribution of casual variables in increasing the maize production as well as profitability to farmers from maize cultivation/ production. The Objective of the study is to examine the cost and returns of maize among the farmers in the study area. Methodology of this study is based on the analysis of the data collected from three hundred maize farmers. Interview schedule was the main tool used to collect the pertinent data from the selected maize farmers. The primary as well as secondary data have been used for this study. The primary data was collected from selected three hundred maize farmers from Tirupur district; by adopting multi stage stratified random sampling method. On the basis of stratification, out of 300 farmers, 165 (55 percent) belonged to small, 90 (30 percent) belonged to medium and 45 (15 percent) belonged to large farmers. Through the analysis of the study, it is identified the cost of cultivation per acre is lower for large farmers than small and medium farmers. The major hindrance expressed by the farmers was the lack of quality seeds. They felt that there was an admixture of seeds of different qualities, which results in poor germination and lower production. Also, the use of high yielding varieties of maize is poor and hence the extension agencies need to be strengthened to restore the confidence in the farmers regarding the quality of seeds and to encourage the use of more high yielding varieties. This study is concluded with the finding that an optimum utilization of the resources available at the disposal of the maize growers together with necessary efforts to address the problems identified in the maize cultivation will ensure higher net returns to the maize growers in the study area.*

**KEYWORDS :** Cost, Returns, production, etc,

### INTRODUCTION

Maize is one of the important cereal crops in the world's agricultural economy both as food for men and feed for animals. Maize is called "Queen of Cereals"<sup>1</sup>. Because of its higher yielding potentials compared to other cereal crops. Origin of the crop is Central America. The crop is cultivated throughout the world in a varied range of soil and climatic conditions. Maize provides nutrients for humans and animals and serves as a basic raw material for the production of starch, oil, protein, alcohol beverages, food sweeteners and more recently, fuel. Maize is high yielding, easy to process, and cost is less than other cereals. It is also a versatile crop, allowing it to grow across a range of agro-ecological zones. Every part of the maize plant has economic value: the grain leaves, stalk, tassel, and cob can all be used to produce a large demand for food, feed, fuel and industrial raw material; demand for maize is also hooking up<sup>2</sup>.

### REVIEW OF LITERATURE

Anwarul et al., (2010)<sup>3</sup> in their research paper "Technical Efficiency of Chilly Production" used cost concepts in measuring cost and returns for chilly production. The study showed that, on an average total variable cost of production and total cost of production per hectare of land was Tk 71,950/- and Tk 78,950 respectively (Taka: unit of money). The net return was Tk 73,164 and the undiscounted Benefit –Cost Ratio was greater than unity.

Mahalakshmi (2009)<sup>4</sup> in her study "Cost and Return in Vanilla Cultivation" using Cobb- Douglas production function revealed that the benefit-cost ratio was found to be much greater even after discounting, showing a ratio of 19.89, indicating that every one rupee of investment, the farmer will receive Rs.20 (approx) as return. The study concluded vanilla cultivation as much profitable.

Rupasena et al, (2008)<sup>5</sup> used Cobb-Douglas production function to evaluate the resource use efficiency in their study "Resource Use Efficiency in Rice Cultivation in Srilanka". They found that to obtain optimum yield levels, the farmer must reduce the expenditure on fertilizer and labour and should increase the seed rate.

Grover and Singh (2007)<sup>6</sup> in their research "Sesame Cultivation in Punjab" reported that cost on human labour and cost on plant protection measures were significant at five per cent level on large farms and one per cent level on small farms using Cobb-Douglas Production function.

Jitendra Singh et al., (2006)<sup>7</sup> in their study "Present Status and Economies of Organic Farming" cost concept is used in measuring cost and returns for paddy. The study found that the cost of cultivation for organic paddy over cost  $A_1$  and cost  $C_3$  as Rs. 18,786/ha and Rs. 31,651/ha and for non-organic paddy was Rs. 19,106/ha and Rs. 35,947/ha respectively. The yield from organic and non-organic paddy was 26.86q/ha and 32.74 q/ha respectively. However, farmers could realize relatively higher prices for organic (Rs. 1,380/q) than non-organic (Rs. 1,161/q) paddy. Net returns over cost  $A_1$  and cost  $C_3$  from organic and non- organic paddy had been found at Rs. 20,144/ha and Rs. 7,279/ha and Rs. 21,323/ha and Rs 4,483/ha respectively. The study concludes that organic paddy was more profitable than non-organic paddy cultivation.

Chahal and kataria (2005)<sup>8</sup> using the cost concept in their study "Technological adoption and cost return aspects of Maize Cultivation in Punjab" estimated the cost and return of maize in Punjab. The total operation cost of hybrid maize was Rs.8, 956/ha as compared to Rs.6, 427/ha for local variety and Rs.8, 009/ha for composite varieties. Labour cost contributed more than one third of the operational cost. Fertilizer accounted for 20 per cent of the operational cost in case of hybrid varieties. The estimated average yield of hybrid varieties was 36.26q/ha. Both gross and net returns in case of hybrid maize amounted to be Rs.19, 637.48 and Rs.10, 681.65 per hectare, respectively. This study concludes that the use of hybrid maize reduces the operational cost and increases the yield.

Sundar and Kombai Raju (2004)<sup>9</sup> using the cost concept in their research "Economies of Production of Gloriosa" computed cost and returns in gloriosa cultivation. The author classified cost of production into two types namely establishment cost and maintenance cost respectively. He has also apportioned total establishment cost to different crop years and included under fixed cost. The study found that the average cost of production per kg of gloriosa seed was higher in small farmers. The study concluded that large scale production in large farmers was the reason for lesser average cost of production.

### STATEMENT OF THE PROBLEM

Maize is an important crop cultivated in Tirupur District and helps increase the economic condition of the farmers. Maize farmers are facing a number of problems during production and marketing like non-availability of fertile seeds, non availability of labourers, high

wage rate and high rate of pesticides and fertilizers .This study will help to formulate a suitable frame work to analyze the various elements of cost of production. Such a study will ensure proper resource combinations to improve maize production and thereby increasing the profit. A study of the cost and return structure of maize would highlight the profitability pattern. The profitability pattern of small, medium and large farmers would help understanding the pattern of cost and returns among the three groups of farmers.

#### OBJECTIVES OF THE STUDY

- To examine the cost and returns of maize among the farmers in the study area.
- To find average cost and returns varying among the small, medium, and large maize farmers in the study area.

#### HYPOTHESIS

1. There is no significant difference among the small, medium and large farmers in their variable cost per acre for maize cultivation.
2. There is no significant difference among the small, medium and large farmers in their fixed cost per acre for maize cultivation.
3. There is no significant difference among the small, medium and large farmers in their imputed value of family labour per acre for maize cultivation.
4. There is no significant difference among the small, medium and large farmers in their total cost per acre for maize cultivation.

#### METHODOLOGY

The validity of any research is based on the systematic method of data collection and analysis. Both primary and secondary data are used for the present study. Using pretested structured interview schedule, the primary data have been collected from farmers of Tirupur district by adopting multi stage stratified random sampling

per acre were calculated and results are presented in table 1

**TABLE 1**  
**AVERAGE COST OF CULTIVATION OF MAIZE**

S.NO	COST CONCEPT	LAND HOLDINGS (Per Acre/Rs )			
		SMALL (Cost in Rs.)	MEDIUM (Cost in Rs.)	LARGE (Cost in Rs.)	AVERAGE (Cost in Rs.)
I	VARIABLE COST				
	HUMAN LABOUR	2973.333	2944.44	2906.67	2941.48
	MANURE AMOUNT	2905.394	2851.44	2847.89	2868.24
	FERTILIZER	4860.030	4706.78	4778.89	4781.90
	PESTICIDE	641.818	629.44	617.78	629.68
	SEED COST	1989.333	2000.00	1960.00	1983.11
	INTEREST ON WORKING CAPITAL	456.121	437.56	441.89	445.19
	DEPRECIATION	448.212	440.82	456.56	448.53
	MISCELLANEOUS EXPENSES	90.606	84.78	93.67	89.69
	TOTAL VARIABLE COST(I)	14364.848	14095.267	14103.33	14187.82
II	FIXED COST				
	LAND REVENUE AND OTHER TAXES	148.9394	146.56	177.00	157.50
	RENTAL VALUE OF LAND	5029.091	5022.78	5045.78	5032.55
	INTEREST ON FIXED CAPTIAL	1242.182	1224.50	1237.00	1234.56
	TOTAL FIXED COST(II)	6420.212	6393.83	6459.78	6424.61
III	IMPUTED VALUE OF FAMILY	1653.333	1460	813.33	1309.89
	TOTAL COST(I+II+III)	22438.394	21949.10	21376.44	21921.31

Source: primary data

technique. First three blocks were selected. Then the villages of the selected three blocks were listed and ten villages were selected randomly from each block. Finally thirty villages were selected for the study. From each selected village ten maize farmers were selected at random. The sample farmers were stratified into three categories of small, medium and large farmers. On the basis of stratification, among the 300 farmers 165 (55 percent) belonged to small, 90(30 percent) belonged to medium and 45 (15 percent) belonged to large farmers. The field survey was carried out from March 2014 to September 2014.The key statistical techniques adopted for the analysis of data are Descriptive statistics and ANOVA was employed appropriately.

#### LIMITATIONS OF THE STUDY

The study is based on primary data collected from a sample of farmers by survey method. As many of them have not maintained proper records, they furnished the required information from their memory and experience. Hence, the collected data is subjected to recall bias. However maximum efforts were taken to minimize bias by proper cross checks. Adequate care should be taken while generalizing the results, as the study area was restricted to Tirupur district.

#### ANALYSIS AND INTREPRETRATION

This study attempts to find out cost of the production of maize in Tirupur district. This cost refers to the cultivation inputs for the maize production. Inputs such as seed, human and machine labour, natural manure etc., The main objective of this paper is to study whether the cost are favorable or unfavorable to the farmers. The items that constitute the cost of cultivation are seed, manures, fertilizers, pesticides, machine and hired human labour, interest on working capital, rental value of land, operation and miscellaneous costs of maize cultivation

The above table 1 explains the cost of cultivation per acre for small, medium and large farmers respectively. The cost of cultivation per acre for a small farmer is Rs. 22438.39, for a medium farmer it is Rs.21949.10 and for a large farmer it is Rs.21376.44 respectively. The values indicate that the cost of cultivation per acre decreases with the size of the land. The following are certain observations on increase in cost. In the case of small and medium farmers the imputed value of family labour is higher than large farmers, hence they do not have agricultural equipment like tractors and power sprayers etc. But the large farmers use the advanced technology, tractors, other agricultural equipment and also high quality fertilizers and pesticides. This causes more fixed cost expenditure for large farmers. Therefore as per the table 1, the cost of cultivation per acre is lower for large farmers than small and medium farmers.

**ESTIMATION OF COST: Different ways /means**

**Labour:** The labour cost includes both machine and human labour. Human labour is used for digging, canal irrigation, and application of fertilizer, application of pesticide, cleaning of the irrigation canal and removing dry leaves. Machine labour is used for ploughing by tractors. These costs were valued at the actual rates paid by the farmers.

**Inputs:** Seeds were produced in the farm itself or brought from elsewhere. In the case of farm produced seeds, the prevailing market price was taken into account. Seed (Purchased), insecticides and pesticides, manures, fertilizers (purchased) and irrigation charges were valued at the rates actually paid by the farmers.

**Depreciation charges:** Agricultural implements, oil engine, bullock cart, bullock power sprayer were valued at straight line method calculated depreciation per annum.

**Interest on Working Capital:** The interest on working capital is valued at 10 per cent of the total value of the cost of seeds, natural manures, fertilizers, pesticides, hired human labour, depreciation of agricultural implements and irrigation charges.

**Rental Value of Land:** It is valued at the actual rent paid by the farmers.

**Farm Building:** It refers to a house or shed for storage of maize and for keeping implements.

**Machinery:** It refers to oil engines, tractors, tillers and power sprayer owned by a farmer.

**Imputed Value of Family Labour:** Value of the rates of wages paid for hired labour for similar work by the members of the family.

**Cost A: VARIABLE COST:** Labour + Seed + Natural Manures + Fertilizers + Pesticides + Depreciation charges + Interest on working capital.

**Cost B: FIXED COST: Land revenue and other taxes+ Rental value of land+ Interest on Fixed Capital**

**Total Cost:** The total cost is calculated by adding the following three items namely, Cost A, Cost B and imputed value of family labour.

**VARIABLE COST OF CULTIVATION**

ANOVA is used to test whether there is any significant difference in total variable cost for cultivation of maize per acre among the three types of farmers, viz., Small, Medium and large. The analysis is presented in the table given below: 2

**Null Hypothesis:** There is no significant difference among the small, medium and large farmers in their variable cost per acre for maize cultivation.

**TABLE 2**

VARIABLE COST			
LAND HOLDINGS	Mean (Rs.)	N	Std. Deviation (Rs.)
Small farmers	14365	165	2155
Medium farmers	14095	90	2063
Large farmers	14103	45	2058
Total	42563	300	6276

**TABLE 2.A**

Groups	Sum of Squares	Df	Mean Square	F	P Value	Sig.
Between Groups (Combined)	56808812.401	2	28404406.2	39.434	P<0.01	*
Within Groups	357987825.191	297	720297.435			
Total	414796637.592	299				

**Source: Primary Data**

\* 5% level of Significance

As the P value is less than 0.05 it is inferred that there is significant difference in mean variable cost among small, medium and large farmers. Hence the null hypothesis is rejected. This indicates that there is a significant difference in the variable cost for the cultivation of maize per acre among small, medium and large farmers.

**FIXED COST OF CULTIVATION**

ANOVA is used to test whether there is any significant difference in total Fixed cost for cultivation of maize per acre between the three types of farmers, viz., small, Medium and large. The analysis is presented in the table given below: 3

**Null Hypothesis:** There is no significant difference among the small, medium and large farmers in their fixed cost per acre for maize cultivation.

**TABLE 3**

FIXED COST			
LAND HOLDINGS	Mean (Rs.)	N	Std. Deviation (Rs.)
Small farmers	6420	165	370.1
Medium farmers	6393	90	349.8
Large farmers	6459	45	448.2
Total	19273	300	1168.1

**TABLE 3.A**

Groups	Sum of Squares	Df	Mean Square	F	P Value	Sig.
Between farmers Groups	131896	2	65948	0.46	0.629	Ns
Within Groups	42184418	297	142035			
Total	42316314	299				

**Source: Primary Data**

As the P value is greater than 0.05 it is inferred that there is no significant difference in mean fixed cost among small, medium and large farmers. Hence the null hypothesis is accepted. This indicates that there is a significant difference in the fixed cost for the cultivation of maize per acre among small, medium and large farmers.

**IMPUTED VALUE OF FAMILY LABOUR**

ANOVA is used to test whether there is any significant difference in cost for cultivation of maize per acre between the three types of farmers, viz., small, Medium and large. The analysis is presented in the table given below: 4

**Null Hypothesis:** There is no significant difference among the small, medium and large farmers in their imputed value of family labour per acre for maize cultivation.

**TABLE 4**

IMPUTED VALUE OF FAMILY LABOUR			
LAND HOLDINGS	Mean (Rs.)	N	Std. Deviation (Rs.)
Small farmers	1653	165	836.4
Medium farmers	1460	90	779.0
Large farmers	813	45	551.3
Total	3926	300	2166.7

**TABLE 4.A**

Groups	Sum of Squares	Df	Mean Square	F	P Value	Sig.
Between Groups	1129200	2	564600	0.836	0.435	Ns
Within Groups	200622667	297	675497			
Total	201751867	299				

**Source:** Primary Data

As the P value is greater than 0.05 it is inferred that there is no significant difference in mean imputed value of family labour cost among small, medium and large farmers. Hence the null hypothesis is accepted. This indicates that there is a significant difference in the imputed value of family labour cost for the cultivation of maize per acre among small, medium and large farmers.

**TOTAL COST**

ANOVA is used to test whether there is any significant difference in total cost for cultivation of maize per acre between the three types of farmers, viz., small, Medium and large. The analysis is presented in the table given below:

**Null Hypothesis:** There is no significant difference among the small, medium and large farmers in their Total cost per acre for maize cultivation

**TABLE 5**

TOTAL COST			
LAND HOLDINGS	Mean (Rs.)	N	Std. Deviation (Rs.)
Small farmers	22438	165	1833
Medium farmers	21949	90	1848
Large farmers	21376	45	1771
Total	65763	300	5452

**TABLE 5.A**

	Sum of Squares	Df	Mean Square	F	P Value	Sig.
Between Groups	1276613563.642	2	638306781.821	86.81	0.000	**
Within Groups	3654288208.8.6	297	7352692.573			
Total	4930901772.448	299				

**Source:** Primary Data\*\*

1% level of Significance

As the P value is less than 0.01 it is inferred that there is significant difference in mean total cost among small, medium and large farmers. Hence the null hypothesis is rejected. This indicates that there is a significant difference in the total cost for the cultivation of maize per acre among small, medium and large farmers.

**RETURNS FROM MAIZE CULTIVATION**

ANOVA is used to test whether there is any significant difference in total returns from cultivation of maize per acre between the three types of farmers, viz., small, Medium and large. The analysis is presented in the table given below:

**Null Hypothesis:** There is no significant difference among the small, medium and large farmers in their returns from maize cultivation.

**TABLE 6**

RETURNS			
LAND HOLDINGS	Mean (Rs.)	N	Std. Deviation (Rs.)
Small farmers	10594	165	1589
Medium farmers	11278	90	2063
Large farmers	13101	45	2080
Total	34974	300	5732

**TABLE 6.A**

	Sum of Squares	Df	Mean Square	F	P Value	Sig.
Between Groups (Combined)	141450028.28	2	70725014.14	11.78	P<0.01	*
Within Groups	2983796795.47	297	6003615.283			
Total	3125246823.75	299				

**Source:** Primary Data\*

5%level of Significance

As the P value is less than 0.05 it is inferred that there is significant difference in mean returns among small, medium and large farmers. Hence the null hypothesis is rejected. This indicates that there is a significant difference in the returns for the cultivation of maize per acre among small, medium and large farmers

**The following are the findings of the study:**

1. From the study it was found that the cost of cultivation per acre is lower for large farmers than small and medium farmers. The value indicates the cost of cultivation per acre decreases with the size of the land.

2. This study shows that there is a significant difference in the total variable cost for the cultivation of maize per acre among small, medium and large farmers. The null hypothesis is rejected. The total variable cost per acre for small farmers is higher than medium and large farmers.

3. It is identified from the study that there is no significant difference in total fixed cost for the cultivation of maize per acre among small, medium and large farmers. The null hypothesis is accepted. The total fixed cost per acre among large farmers is higher than medium and small farmers.

4. The present study results show that there is no significant difference in the imputed value of family labour for the cultivation of maize per acre among small, medium and large farmers. The null hypothesis is accepted. The imputed value of family labour for small farmers is higher than the medium and large farmers.

5. From the study we know that there is significant difference in the total cost of cultivation of maize per acre among small, medium and large farmers. The null hypothesis is rejected. The total cost of cultivation per acre for small farmers is higher than large farmers.

6. The current study identified that there is significant difference in the returns from cultivation per acre among small, medium and large farmers. Large farmers have got more returns than medium and small farmers

**SUGGESTIONS AND RECOMMENDATIONS:**

1.The large farmers used the advanced technology like tractors, power sprayers, other agriculture equipments and also high quality fertilizers, seeds and pesticides .The economy and efficiency in production will lead them to increase the productivity .Adoption of successful advanced technology also by small and medium farmers should be encouraged.

2. Regarding the small farmers, they are unaware of optimum utilization of fertilizers, pesticides and manures. So they need training programs by the Agricultural University and Horticulture Directorate in the region. To make aware the small farmers to optimum use of resources should be applied for.

3. Agricultural Universities and Research Institutes have done commendable job with regard to researches in crops like rice, cotton, banana, etc., there is an urgent need to make a breakthrough in maize research.

4. The major hindrance expressed by the farmers was the lack of quality seeds. They felt that there was an admixture of seeds of different qualities, which results in poor germination and lower production.

Also, the use of high yielding varieties of maize is poor and hence the extension agencies need to be strengthened to restore the confidence in the farmers regarding the quality of seeds and to encourage the use of more high yielding varieties.

5. Higher minimum support price for maize may be fixed by the government in order to make the farmers get increased profits. This will enhance their "staying power" and avoid "distress sale" at the farm itself immediately after harvesting.

## CONCLUSION

Maize cultivation exhibits substantial variations in the cost of production and in the net returns. All the resources used by the farmers in maize cultivation were excessively utilized. Achieving a higher productivity calls for removing the constraints in maize cultivation. An optimum utilization of the resources available at the disposal of the maize growers together with necessary efforts to address the problems identified in the maize cultivation will ensure a higher net return to the maize growers in the study area.

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