ESTIMATION OF INCOME, EXPENDITURE AND RESOURCE USE PATTERN OF GROUNDNUT IN THANDRAMPATTU BLOCK OF TIRUVANNAMALAI DISTRICT, TAMIL NADU, INDIA

ABSTRACT

The core objective of the research estimation of income, expenditure and resource use pattern of groundnut in Thandrampattu block of Tiruvannamalai district is to evaluate the performance of groundnut in terms of cost and returns and resource use efficiency. The sample of 30 farmers growing groundnut were selected at random from the Thandrampet, Veppur, Thanipadi and Vanapuram villages of Thandrampattu Block of Tiruvannamalai District. Average and percentage analyses were used to examine cost of cultivation, labour hours used, quantity of materials used and machine hours used by farmers in each crop production. Regression analysis was used to assess the impact of selected explanatory variables on independent variables. Joint families account for around 33% of total sample homes, with nuclear families accounting for 67 percent. Average size of holding is 2.84 acres. Total cost of cultivation for groundnut is Rs.16371.68/acre. Gross income from groundnut is Rs.54000/ac. Benefit Cost Ratio (BCR) of groundnut cultivation is 3.30. Farmers sell the produce at regulated market, mill owners and local traders. The human labors were used for sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. FYM, chemicals, fertilizer and seed are the major material used in crop production. Harvester, rotavator and bund former are the machine used for crop production. About 69 percent of variation in dependent variables explained by the selected independent variables such as labor hours for inters cultural operation, land holding size and quantity of FYM.

Key words: cost, returns, resource use efficiency, cost of cultivation, intercultural operations

1. INTRODUCTION:

Agriculture is the most important sector of Indian Economy. Indian agriculture sector accounts for 18 per cent of India's gross domestic product (GDP) and provides employment to 50% of the countries workforce [1, 2, 3]. At present Indian agriculture is at crossroads and one of the major challenges is to reverse deceleration in agricultural growth [4]. Main reason for deceleration in agricultural growth is declining investment particularly, public investment in agriculture research and development and irrigation, combined with inefficiency of institutions providing inputs and services including rural credit and extension, post-harvest losses of food grains at 10 percent of the total production or about 20 MT [5]. In Tiruvannamalai, agriculture and silk weaving are the important occupation. Even though there are no perennial rivers in the district, tanks and dug wells are the major sources of irrigation [6]. Groundnut is one of the major crops grown in the district. Tiruvannamalai district is leading producer of Groundnut [7]. The study attempts to analyze the cost of cultivation, maximum returns, highest resource use efficiency and more employment generation from groundnut cultivation in Thiruvannamalai district.

1.1 Objectives

The core objective of the study is to evaluated the performance of groundnut grown in Thiuvannamalai District with the following specific objectives.

- To analyses input utilization pattern of groundnut production in study area.

- To analyses cost and returns in production of groundnut in study area.
- To analyze resource use efficiency in production of groundnut.

1.2 Hypothesis are as follows

1. Farmers are not utilizing the resources efficiently in production of groundnut.
2. Returns are higher than cost in the cultivation of groundnut.
3. Resource use efficiency in production of groundnut would be low.

2. MATERIALS AND METHODS

2.1 Design of the Study

Designing a suitable methodology and selection of analytical tools are important for meaningful analysis of any economic problem. Thandrampattu block of Tiruvannamalai district is selected based on purposive sampling method (non-probability) for the present study since Agricultural College and Research Institute, Vazhavachannur is located in this block. Based on the discussion with extension officials the following villages were considered for the study viz., Valavachanur, Perunduraipattu, Vanapuram, Veppur, Tanipadi, Tandrampattu, Keelsirupakkam, Aandapattu. The sample of 30 farmers growing Groundnut was selected at random from the Thandrampet, Veppur, Vanapuram villages as follows.

2.2 Sample size

A sample of 30 Groundnut growing farmers purposively selected at random from the Thandrampet, Veppur, Thanipadi and Vanapuram villages of Thandrampattu block of Tiruvannamalai District. About 30 samples of groundnut farmers are sufficient to represent all groundnut farmers as there is no significant difference among farmers in groundnut cultivation practices in the study area. Sample size of the respondent and selected villages is presented in table 01.

Table 01. Sample size of the respondent

Sl. No,	Crop	Nature of the crop	Sample size	Selected Villages
1.	Groundnut	Oilseed	30	1. Thandrampet, 2. Veppur, 3. Thanipadi, 4. Vanapuram

Groundnut occupies 97.6 percent of total area of Oil seed crops in Tiruvannamalai district. Secondary data were collected from the Department of Economics and Statistics which is used as the base for selection of crops for the study. Primary data for the study is collected by face to face survey method from 30 farmers using pre-prepared interview schedule. The study was undertaken from August 2020 to March 2021.

2.3 Tools of Analysis:

The choice of the statistical tool of analysis was decided with reference to the objectives of the study and the nature of the data collected. The collected data were tabulated, analyzed for drawing meaningful inferences. Average and percentage analyses were used to examine the nature of production, income and expenditure for crop production, labour hours used for different crop production activities, materials used; machine hours used by farmers in each crop production.

2.4 Regression Analysis

In this study, regression analysis was employed to measure the influence of selected explanatory variables on independent variables [8, 9]. There are numerous factors, determining the yield of groundnut in the sample households. The major

independent variable influencing yield of groundnut are irrigation, labor hours for inter cultural operation, quantity of seed in kg, quantity of FYM in kg, quantity of chemicals in lit, land holding size in acre, quantity of fertilizer in kg, . Hence, a linear type of production function was fitted to the data separately for groundnut.

Groundnut

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + e_t$$

Where,

Y = Yield of Groundnut in kg

X_1 = Labor hours for Inter cultural Operation

X_2 = Quantity of FYM in Kg

X_3 = Land holding size in acre

a = Constant

e_t = Disturbance terms

b_1, b_2 and b_3 are Regression Coefficient

2.5 Garette's Ranking

To study the problems faced by farmer at farmers market and factors that attract the consumers to farmer market Garette's ranking technique was used [10, 11, 12]. The order of merit assigned by the respondents were converted into ranks by using the following formula.

$$\text{Percent position} = \frac{(Rij - 0.5)\ 100}{Nj}$$

Where,

R_{ij} = Rank given for i_{th} factor by j_{th} individual

Nj = Number of factors ranked by j_{th} individuals

By using Garette's score table the percent positions of each rank was converted into scores. Then, for each factor, the score of individual despondence were added together and divided by the total number of respondents for whom scores were added. The mean scores of all the factors were arranged in descending order and ranks were given. The factor having the highest mean value was considered to be the most important.

1. Result and Discussion

3.1 General Characters of Sample Households

General Characters of Sample farm Households are presented in the table 02.

Table: 02 Family Type of the sample households

Sl. No,	Family Type	Number of Households	% to Total
1	Joint family	10	33.33
2	Nuclear Family	20	66.67
3	Total	30	100.00

It is observed from the table 02 that about 33 percent of family live together as joint family. In the joint family system availability of family labor is more and they share the farm works. The remaining 67 percent of the family follow the nuclear type family systems.

3.2 Land holding pattern

Land holding pattern of Sample farm Households are presented in the table 03.

Table: 03 Land holding pattern of the sample households

SL. No.	Particulars	Area in ac	% to total

1	Area owned in ac	85.23	95.20
2	Area leased in	4.30	4.80
3	Total area	89.53	100.00
4	Average size of holding	2.84	--

Land holding pattern of Groundnut growing farmers is presented in table 03. The sample farmers owned about 85.23 acre of land with average size of holding of 2.84 acre. Area leased in is about 4.80 percent of the total area under cultivation.

3.3 Cropping pattern

Cropping pattern of Sample farm Households are presented in the table 04.

Table: 04 Cropping pattern of the sample households

SL. No.	Particulars	Area in ac	% to total
1	Area under groundnut	48.38	54.04
2	Area under other crop	41.15	45.96
3	Total area under crop	89.53	100.00
4	Irrigated area under groundnut	47.00	--

Cropping pattern of groundnut growing farmers is presented in table 04. The Total under crop is 72.43 acre of which area under groundnut is 52.09 percent while area under other crop occupies 47.91 percent. Irrigated area under groundnut is 36.48 acre.

3.4 Varieties wise area under groundnut

Varieties wise area under groundnut is given in the table 05.

Table: 05 Varieties wise area under groundnut

Sl. No	Crop	Sl. No	Variety	Area in Acre	Percent to total

3	Groundnut	1	Traditional	23.33	48.22
		2	JLR	2.75	5.68
		3	TMV7	15.00	31.00
		4	TMV13	7.30	15.09
		5	Total	48.38	100.00

Varieties wise area under groundnut is presented in table 05. Traditional variety of groundnut occupies 48.22 percent of total area under groundnut followed by TMV7 with 31.00 percent of total area under groundnut, TMV13 with 15.09 percent of total area under groundnut and JLR occupies 5.68 percent of total area under groundnut.

3.5 Cost of cultivation of groundnut

Cost of cultivation of groundnut in the sample households is furnished in the table06. Higher cost in Tamil Nadu was because 40 percent of the groundnut was grown under irrigated conditions with higher input use compared to other major producing states [13, 14].

Table: 06 Cost of cultivation of groundnut in the sample households (Rs./ac)

Sl. No.	Particulars	Amount (Rs./ac)	% to total
1	Seed	4568.56	27.91
2	FYM	1576.28	9.63
3	Urea	199.57	1.22
4	DAP	1262.40	7.71
5	MOP	527.00	3.22
6	Complex	470.06	2.87
7	Gypsum	245.90	1.50
8	Growth regulators	0.00	0.00
9	Herbicides	0.00	0.00

10	Fungicides	873.28	5.33
11	Insecticides	864.78	5.28
12	Combine harvester	1400.00	8.55
13	Rotavator	1069.97	6.54
14	Bund former	0.00	0.00
15	Earthling up	0.00	0.00
16	Transplanting	0.00	0.00
17	Weeding	1450.19	8.86
18	Harvesting	870.61	5.32
19	Transport	204.01	1.25
20	Packaging	789.07	4.82
21	Total cost	16371.68	100.00

Total cost of cultivation for groundnut is Rs.16371.68/acre of which seed constitutes 27.91 percent of total cost of cultivation followed by FYM with 9.63 percent, weeding with 8.86 percent, bund former with 8.55 percent, DAP with 7.71 percent, rotavator with 6.54 percent, fungicides with 5.33 percent, harvesting with 5.32 percent, insecticides with 5.28 percent, packaging with 4.82 percent, MOP with 3.22 percent, complex with 2.87 percent, gypsum with 1.50 percent, transport with 1.25 percent and urea with 1.22 percent of total cost of cultivation.

3.6 Income parameters of groundnut

Income parameters of groundnut in the sample households are presented in the table07. Average groundnut yield under front line demonstrations was observed as 1690 Kg/ha which was higher by 21.11% over the prevailing farmers yield was 1394 Kg/ha [15].

Table: 07 Income parameters of groundnut in the sample households (Rs./ac)

Sl. No.	Particulars	Amount (Rs./ac)	% to Gross Income
1	Total cost (Rs./ac)	16371.68	30.32
2	Yield (kg/ac)	900.00	--
3	Price (Rs./kg)	60.00	--
4	Gross income (Rs./ac)	54000.00	100.00
5	Net income (Rs./ac)	37628.32	69.68
6	BCR	3.30	--

Average yield of groundnut is 900 kg/ac and the price is Rs.60/kg. Gross income from groundnut is Rs.54000/ac of which total cost constitutes 30.32 percent and net return occupies 69.68 percent. Benefit Cost Ratio (BCR) of groundnut cultivation is 3.30. Accept the groundnut cultivation since the Benefit Cost Ratio of groundnut cultivation is greater than one.

3.7 Place of sale

Place of sale of groundnut in the sample households is presented in the table08.

Table: 08 Place of sale by groundnut growing famers

Sl. No.	Place of Sale	Number of Farmers	% to total
1	Local Traders	4.00	13.33
2	Direct Procurement Centre	0.00	0.00
3	Aggregators	0.00	0.00
4	Regulated Market	20.00	66.67
5	Wholesale Market	0.00	0.00
6	Cooperatives	0.00	0.00
7	Mill Owners	6.00	20.00

8	Total Number of Farmers	30.00	100.00

Place of sale by groundnut growing famers are presented in table08. The marketing place taken into consideration are local traders, Direct Procurement Centre, aggregators, regulated market, cooperatives, and mill owners. There are about 66.67 percent of groundnut farmers preferred to sell their produce at Regulated Market. The Mill Owners were preferred by 20.00 pec cent of total farmers and the Local Traders were preferred by 13.33 pec cent of total farmers to sell their produce.

3.8 Resource use Efficiency

Inefficient use of resources is the reason for declined growth of agriculture sector [16, 17]. Labor, material and machine usage pattern in groundnut growing sample households are as follows.

3.8.1 Human labor hour usage pattern

Human labor hour usage pattern in the groundnut growing sample households is presented in the table 09. Human labor occupied the major share (27.07%) of total cost of Rs.33245.0 per ha in Groundnut seed production [18].

Table: 09 Human labor hours usage pattern in groundnut growing sample households

Sl. No.	Particulars	Hours	% to total
1	Sowing & transplanting	45.58	18.70
2	FYM	3.80	1.56
3	Fertilizer	1.42	0.58
4	Chemicals	3.91	1.60
5	Inter cultural operation	189.05	77.56
6	Total men hours	243.76	100.00

The human labors were evaluated for different farm operations such as sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. Total human labor hours in groundnut cultivation is 224.40/ac. Inter cultural operation constitutes 77.56 percent of the total human labor hours followed by sowing & transplanting, chemicals, FYM and fertilizer constitutes 18.70 percent, 1.60 percent, 1.56 percent and 0.58 percent respectively.

3.8.2 Material usage patterns

Material usage patterns in the groundnut growing sample households are furnished the table 10.

Table: 10 Material usage patterns in the groundnut growing sample households

Sl. No.	Particulars	Quantity	% to Total
1	Seed (Kg/ac)	40.22	3.00
2	FYM (Kg/ac)	717.24	53.49
3	Fertilizer (Kg/ac)	111.51	8.32
4	Chemicals (ml/gm/ac)	471.93	35.20
	Total Material	1340.90	100.00

Material usage patterns in the groundnut growing sample households are presented table10. FYM occupies 53.49 percent of total material usage followed by chemicals, fertilizer and seed constitutes 35.20 percent, 8.32 percent and 3.00 percent of total material usage respectively.

3.8.3 Machine usage patterns

Machine hour usage patterns in the groundnut growing sample households are presented the table 11.

Table: 11 Machine hour usage patterns in the groundnut growing sample households

Sl. No.	Particulars	Hours	% to total
1	Harvester	0.03	2.59

2	Rotavator	1.13	97.41
3	Bund Former	0.00	0.00
4	Total machine hours	1.16	100.00

Harvester, rotator and bund former are the major machineries used in groundnut production. Rotavator constitutes 97.41 percent of total machine hours followed by harvester occupy 2.59 percent of total machine hours.

3.8.4 Factors influencing the yield of the Groundnut:

Estimates of regression model for factors influencing the yield of groundnut are furnished table 12.

Table: 12 Estimates of regression model for factors influencing the yield of groundnut

Sl. No.	Variables	Notation	Mean	Co-efficient	t Stat
1	Yield of groundnut in Kg	Y	2007.33	-	-
2	Labor hours for inter cultural operation	X_1	304.87	3.12 ***	3.61
3	Quantity of FYM in Kg	X_2	1156.67	0.42 *	1.92
4	Land holding size in acre	X_3	2.84	174.77 **	2.28

Yield of groundnut is dependent variable. Labor hours for inter cultural operation, quantity of FYM and land holding size are the independent variables. Co-efficient of multiple regression is 0.69 which implies that 69 percent of variation in dependent variables explained by the selected independent variables. Labor hours for inter cultural operation is significant at one percent level. Land holding size is significant at five percent level. Quantity of FYM is significant at ten percent level.

Intercept : 76.93

Co-efficient of multiple regression (R^2) : 0.69

F- Value : 19.07

Number of observation	:	30.00
Significant at one percent level	:	***
Significant at five percent level	:	**
Significant at ten percent level	:	*

$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + e$

$Y = 76.93 + 3.12 ***X_1 + 0.42 *X_2 + 174.77 **X_3 + e$

2. Conclusions

Average size of holding is 2.84 acres. Total cost of cultivation for groundnut is Rs.16371.68/acre. Gross income from groundnut is Rs.54000/ac. Benefit Cost Ratio (BCR) of groundnut cultivation is 3.30. Farmers sell the produce at regulated market, mill owners and local traders. The human labors were used for sowing and transplanting, FYM, fertilizer, chemicals, intercultural operations. FYM, chemicals, fertilizer and seed are the major material used in crop production. Harvester, rotavator and bund former are the machine used for crop production. About 69 percent of variation in dependent variables explained by the selected independent variables such as labor hours for inter cultural operation, land holding size and quantity of FYM.

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